FEB. 18
1954

ENGINEERING NEWS-RECORD

EIGHTIETH YEAR OF PUBLICATION

★ ANNUAL REPORT AND FORECAST ★

That construction is one of our biggest industries is a fact that those who direct its fortunes can accept with pride, but must also regard as a challenging responsibility. For the services that this bigness makes possible are those on which the nation's growth and prosperity depend. One consequence is that although construction is big, it is destined to get bigger. And one of the special objectives of this annual report is to bring into focus the elements of strength available to develop this destiny to the full.

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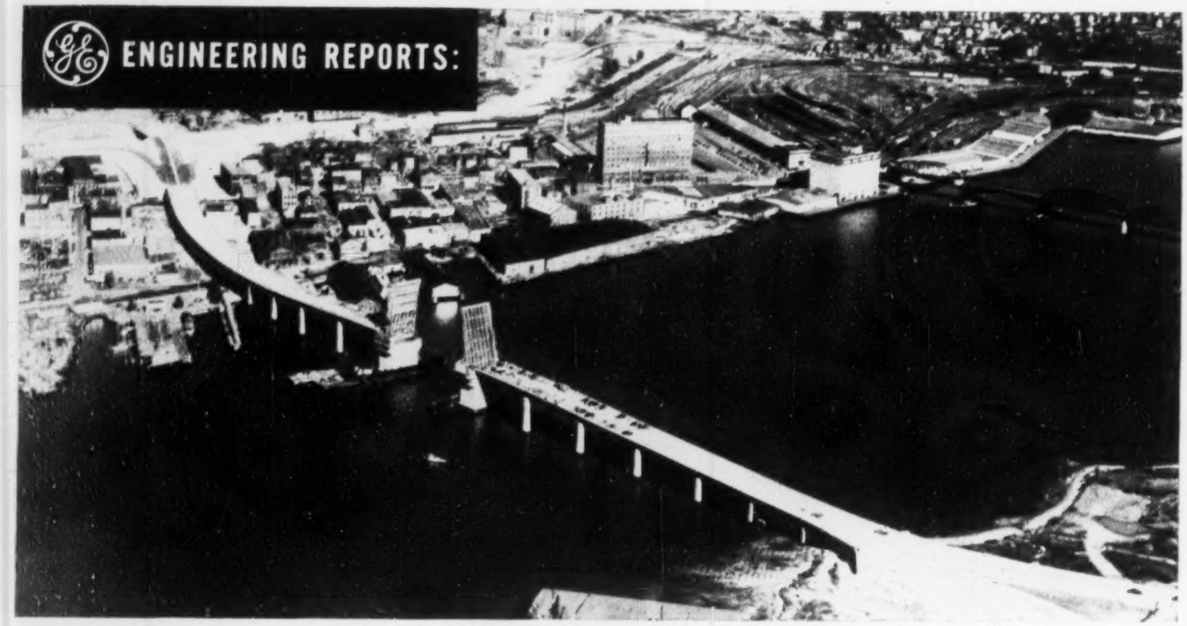
THIS ISSUE
$2.00

A McGRAW-HILL PUBLICATION

ENGINEERING REPORTS:



MOTORISTS SAVE 10 TO 30 MINUTES crossing from Norfolk to Portsmouth via the new G-E equipped bridge and tunnel. Bridge is 4-lane, 2135 ft between abutments. Bascule span is of the double-leaf, rolling-lift type with leaves each 90 ft long.

Bridge's drive system helps speed 29,000 cars per day

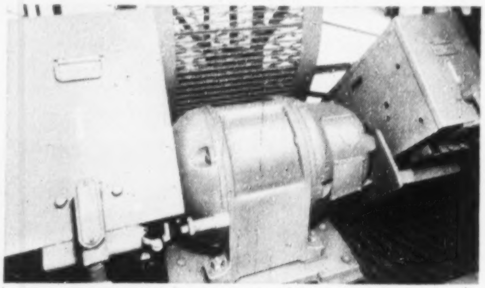
G-E equipment at Portsmouth - Norfolk Bridge gives fast movement, positive control of leaves

The new 4-lane bascule bridge across the Elizabeth River at Norfolk, Va.—part of a combined bridge and tunnel project built for the Portsmouth-Norfolk Bridge Tunnel Commission—is currently handling over 29,000 vehicles per day. Ability to handle this heavy traffic flow is due in part to electric equipment supplied and co-ordinated by General Electric.

In helping to develop the bridge's drive system, G-E engineers worked closely with J. E. Greiner Co., consulting engineers, Tidewater Construction Corp., engineers and contractors, and Tuck and Kendall Inc., electrical contractor. Result of this co-operation: a simple, dependable drive system that expedites traffic because it is easy to operate and provides positive-action control of bridge leaves for fast movement and smooth, safe seating.

This is one more example of how G-E engineers can help your engineers or consultants on electric equipment for heavy construction projects. For other examples of how G-E application engineering has been utilized on many of the important bridge "firsts" throughout the country, contact your local G-E Apparatus Sales Representative or write for a copy of GED-1982. General Electric Co., Schenectady 5, New York. 664-26

POSITIVE-ACTION CONTROL of span motors is centered in this G-E operator's desk. Fine-scale selsyn dial pinpoints position of each leaf during seating.

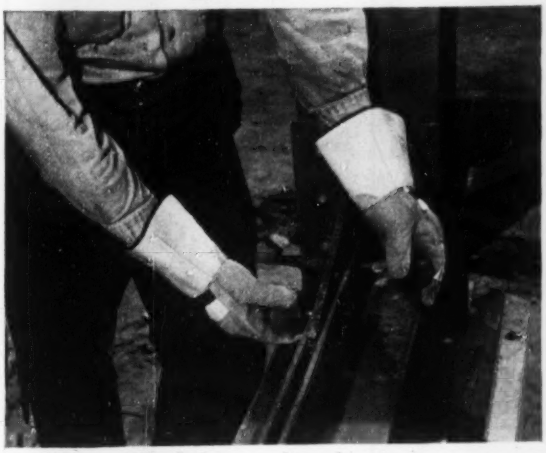


EACH LEAF IS MOVED by 2 G-E 25-hp motors (one shown). G-E motor control center, operated from desk, controls these and tail locks, gates, barriers.

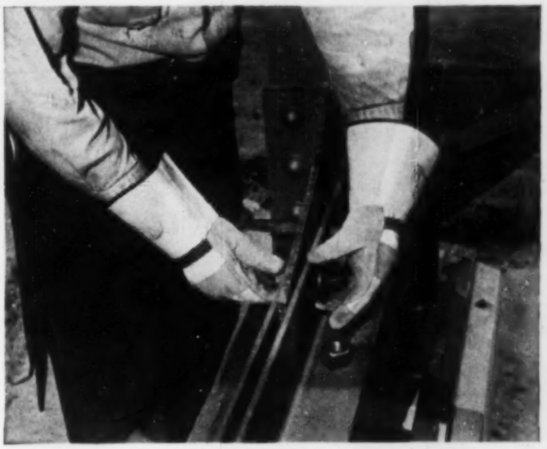
Engineered Electrical Systems for Heavy Construction

GENERAL ELECTRIC

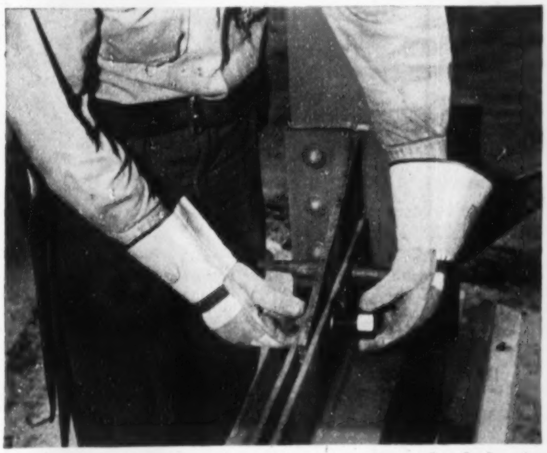
Here's the quick and easy way to join structural members



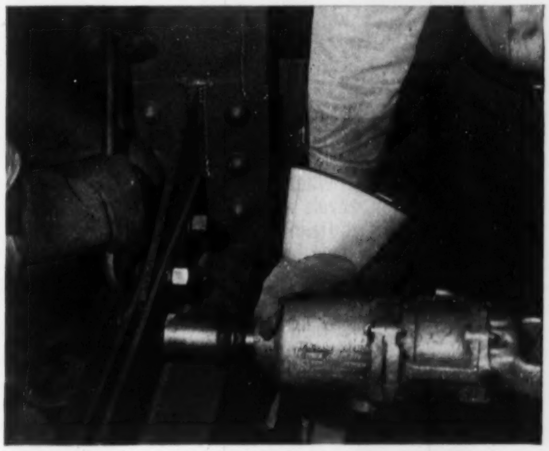
1 The holes are aligned, using one or more drift pins. Then the worker inserts the bolt, placing hardened washer under bolt head.



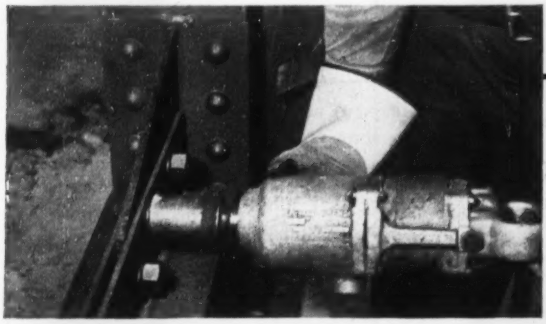
2 Head of bolt is held lightly with fingers as second hardened washer is slipped into place over threaded portion of the bolt.



3 Hexagonal nut is run up on the bolt. At each joint, the initial bolt is tightened sufficiently to keep holes in alignment. Then pins are replaced with bolts.



4 With bolt head held by hand wrench, nut is quickly torqued with pneumatic impact wrench. That's all there is to it! The whole operation takes less than the time to describe it. No wonder this time-saving way of erecting steel with high-strength bolts is growing more popular every day!



◀ *Alternative Method*—The Bethlehem High-Strength Bolt may also be installed by one man. With this method, the nut is first drawn up as far as possible with the hand wrench. Then the impact wrench is used alone.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM HIGH-STRENGTH BOLTS

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Robert F. Boger

Publisher

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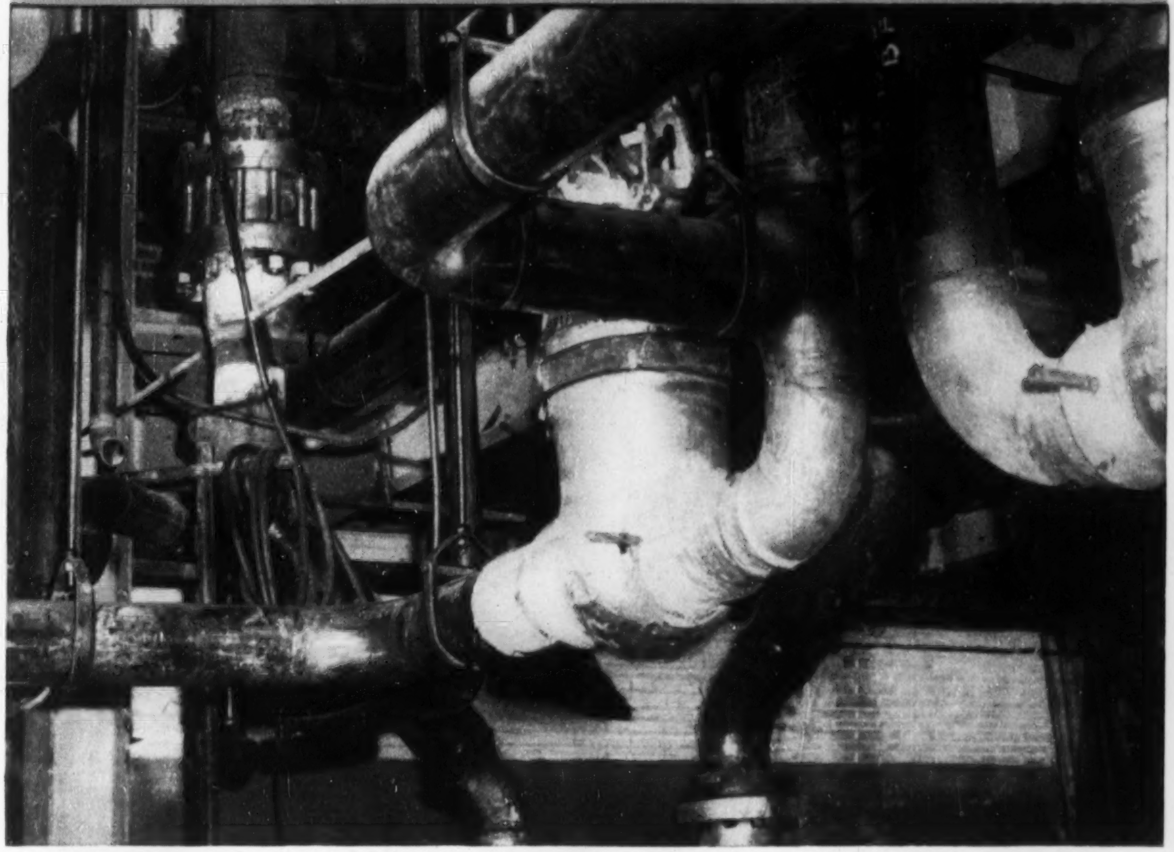
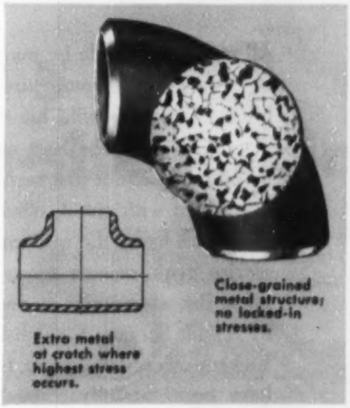
STRONGER THAN PIPE



Boiler feed discharge piping shown under construction above will operate at 2700 psi and 430° F.

Grinnell Welding Fittings

exceed bursting strength of seamless pipe


Close-grained metal structure; no locked-in stresses.
Extra metal at crotch where highest stress occurs.

Grinnell Welding Fittings are designed and processed to have a bursting strength greater than the calculated bursting strength of the seamless pipe to which they are to be welded.

Welding elbows and bends are made from seamless steel pipe by a forging process which produces uniform wall thickness at all points; there is no thinning of outer wall.

Welding tees and crosses are made from seamless pipe by a drawing process which provides extra metal and protection at the crotch, where highest stress occurs.

All Grinnell Welding Fittings are process stress-relieved, thus improving grain structure and increasing the strength of the metal.

With all Grinnell Welding Fittings, you get true circularity; smooth, clean inside surface; full, effective radius; easy, sweeping turns; accurate bevels; and true included angles. Available in a wide range of types and sizes, metals and alloys. Send for descriptive catalog.

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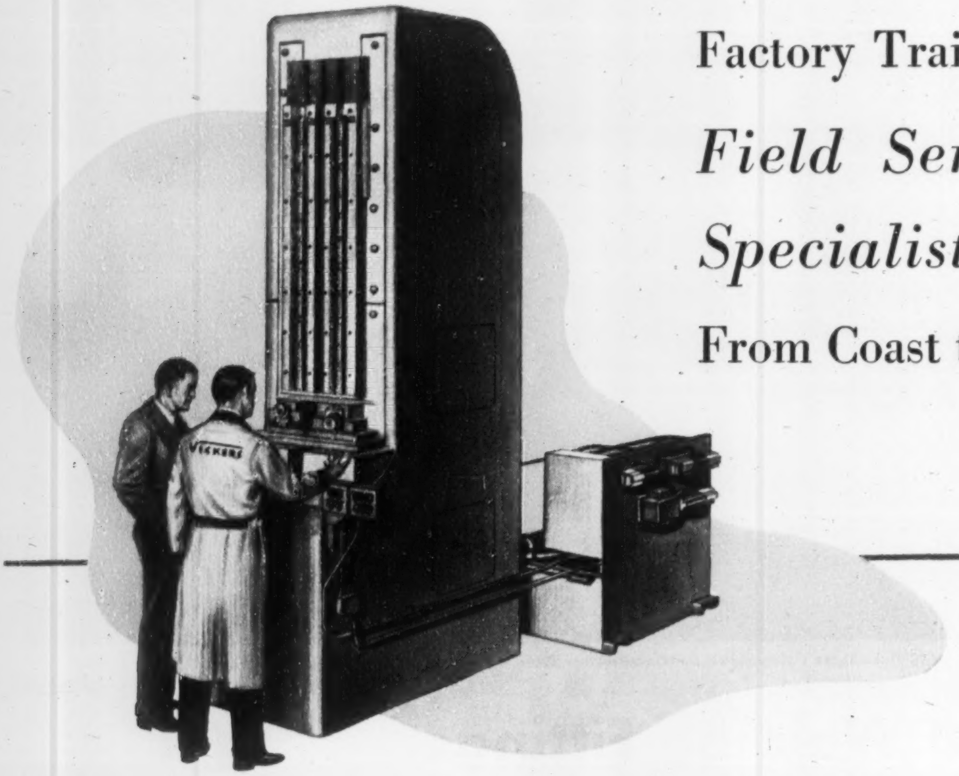

Factory Trained *Field Service Specialists* From Coast to Coast

All machinery made by man requires servicing at times. Every manufacturer has two responsibilities: First, to build his equipment in a way that will require the least amount of servicing. Second, to see to it that servicing, when needed, is handled with speed, efficiency and low cost.

Vickers hydraulic equipment is built to keep service requirements to an irreducible minimum. But when service is required, it is handled by Field Service Specialists working out of Vickers offices from coast to coast. These men have been carefully trained in Vickers plants and are thoroughly competent. They know how to adjust and maintain any piece of Vickers equipment . . . any combination of components. They are also qualified to instruct customers' service organizations in improving their hydraulic maintenance practices. These men devote their full time to servicing Vickers products in customers' plants. They do their job well and at minimum expense.

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6395

ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

B.F.Goodrich

Tires recapped 2 and 3 times after rugged construction-site service

THE Corvallis Sand & Gravel Company processes rock into ready-mixed concrete, concrete block, drainage tile and other building materials. This Oregon firm transports its products to construction sites, operates construction machinery on excavating, grading and bulldozing jobs.

Tires take a terrific beating. Tire costs can skyrocket. Yet Corvallis reports that even after this rugged work, its B. F. Goodrich Rock tires can be recapped two and three times!

One reason for such outstanding tire performance is the patented BFG nylon shock shield. Layers of strong, nylon cords under the tread of B. F. Goodrich off-the-road tires stretch together to protect the tire body from smashing road shocks. This nylon shock shield gives you a 4-way saving: (1) more original hours of service (2) more recappable tires and more hours of service per recap (3) increased bruise resistance (4) less danger of tread separation. You pay nothing extra for this exclusive B. F. Goodrich feature.

And BFG Rock tires (above) have a specially-compounded tread that defies rock cuts and snags. The non-directional tread grips in forward or reverse, resists slippage. You lose no time rescuing bogged-down equipment.

B. F. Goodrich off-the-road tires give longer service at lower cost. See the complete line at your BFG retailer's. The address is listed under Tires in the Yellow Pages of your phone book. *The B. F. Goodrich Company, Tire and Equipment Division, Akron 18, Ohio.*

RESEARCH KEEPS
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FIRST IN RUBBER

Specify B. F. Goodrich tires when ordering new equipment

Study Shows:

Average Yearly Repair Bill $19⁶¹ PER ROLLER

On 26 BUFFALO-SPRINGFIELD 3-Wheelers Used By Large Eastern State.

Repair bills (materials and labor) were carefully logged on each of the 26 Buffalo-Springfield 3-Wheel Rollers used on all types of highway construction and maintenance in a large Eastern state. One of these rollers was in constant use for 12 years. Its total repair bill *for the entire period was less than $200.* That's an average of $16.39 per year! Only 4 rollers averaged over $30 per year for repairs. (Highest was $45.26 per year.)

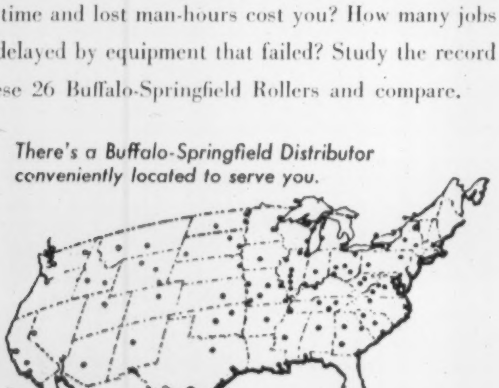
> ***The average yearly repair bill for all 26 Buffalo-Springfield Rollers used was only $19.61 per roller.***

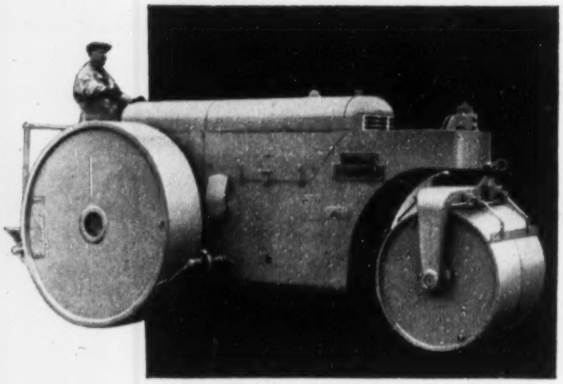
However, savings in repair bills are only a small part of the story. A key piece of equipment that breaks down can hold up an *entire job*, can cost tremendous sums in lost job-time, lost man-hours.

That's why you pay a little more to have Buffalo-Springfield high quality and fine engineered design. One breakdown *that didn't happen* can more than offset the higher initial cost.

Judge for yourself! How much did you pay for repairs last year? More than $20 per roller? How much did down-time and lost man-hours cost you? How many jobs were delayed by equipment that failed? Study the record of these 26 Buffalo-Springfield Rollers and compare.

There's a Buffalo-Springfield Distributor conveniently located to serve you.





This is the Buffalo-Springfield 3-WHEEL ROLLER.

Heavy-duty engineered for continuous service on toughest jobs. Features that give you wide job versatility . . . Exclusive 4-speed transmission to provide a continuous range of roller speeds from 1.1 to 5.0 mph, all at full engine power. Machine-finished ballast-type rolls. High-speed, low-torque clutches for even, smooth reversing. Many more. Models for weights from 5 to 15 tons. Ask for Bulletin S-60-50.

Exact Repair Costs (Materials and Labor) for Each of the 26 Rollers:

ROLLER No.	YEARS ON THE JOB	TOTAL REPAIRS (MATERIAL & LABOR)	AVERAGE REPAIR COST PER YEAR
1	8	267.17	34.64
2	3	8.00	2.66
3	5	36.24	7.24
4	8	109.90	13.73
5	4	28.75	7.18
6	4	15.65	3.91
7	6	125.82	20.97
8	7	135.50	19.35
9	4	72.10	18.02
10	7	132.08	18.87
11	9	195.82	21.75
12	9	190.40	21.15
13	7	168.14	24.02
14	7	169.59	24.22
15	7	79.37	11.33
16	7	264.80	37.83
17	6	67.35	11.23
18	7	192.92	27.56
19	7	246.69	35.24
20	7	147.04	21.00
21	8	134.59	16.74
22	5	20.43	4.08
23	7	181.12	27.88
24	7	118.50	16.65
25	7	316.88	45.26
26	12	196.79	16.39
	175*		$509.90 or $19.61 per roller

* Average almost 7 years on the job per roller.

See your distributor for complete information or write —

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The pictures on this page are typical of Northwest Shovels that are repeat orders in the hands of people whose business is Rock. Each one of these companies has tested Northwest machines continuously in their own rock. They have proved Northwest as a Rock Shovel. They have learned the value of the Northwest Dual Independent Crowd—the crowd that utilizes force most other shovels waste. They have found out what it means to have ease of operation without the complications of pumps, valves and other delicate mechanisms. They have seen the smoother operation and freedom from jerks and grabs characteristic of Northwest Uniform Pressure Swing Clutches. They know what the Cushion Clutch means with its ability to eliminate shock overloads before those overloads can do damage to the machinery. In short, they have proved Northwest advantages to be money makers worth having.

Now is the time to plan to be a Northwest Owner. Now is the time to check into and learn about Northwest. Why not talk to a Northwest Man and get the whole story?

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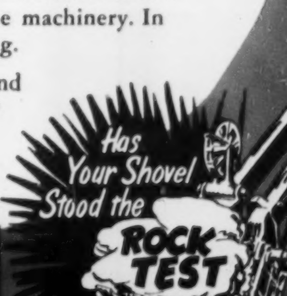

New
PUMPS
for water
drainage

JACUZZI'S new self-priming CONTRACTORS' type PUMPS offer 22 advantages

Here are just 4 of 22 reasons why these newly-developed Jacuzzi pumps are your best buy:

1. **Higher Efficiency** Balanced type of priming port prevents loss of capacity due to recirculation of water.
2. **Less Wear** Renewable plate provides wear surface for impeller, prevents wear on case.
3. **Non-Clogging** Semi-open impellers pump muddy water with abrasives. Clearance is adjustable to compensate for wear.
4. **Easier Priming** Separate priming port eliminates special fittings or need for disturbing piping.

Available now in wide range of h.p. ratings. Choice of electric motor, gasoline engine or heavy-duty transmission head. Don't settle for less!

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Get the facts! Write nearest factory for bulletin "JCT-2" and data sheet "22 reasons why." Also data available on Jacuzzi's rugged sump pumps.

READER COMMENT

Fog on superhighways

SIR: Occasionally your editorials come forward with an interesting challenge. Such is the case in your issue of Nov. 12 regarding "Fog on superhighways." The call for proposals that fall in the Buck Rogers class, made it difficult to restrain from accepting the temptation.

Having driven in north Jersey fog a few times when it was impossible to see ten feet ahead of the front bumper, your challenge comes under the category where "the impossible problem takes a little longer.

If one could justify the economic advantages to write off the expenditure, it may be practicable to erect light steel ribs over the roadway at 20 ft centers and cover them with retractable waterproof curtains like window shades (or perforated metal awnings), motor operated from short-wave remote-control points. Every tenth bay could remain open for ventilation. The pair of curtains on rolls could be mounted at the crown, straddling the center line. The same mounting could be used for continuous ribbon illumination.

There you have it; and you may send the tin medal when somebody can "top" this with a more fiendish idea.

JOSEPH G. CONRATH,
Consulting Engineer,
Erie, Pa.

Less unity for engineers

SIR: I have just read your editorial, "Less Unity for Engineers" (ENR Dec. 10, p. 172) and I wish to state that you have made statements and drawn conclusions that are wholly unsupported by the facts.

Your statements that "NSPE members have no more voice in what it does than do members of societies represented on EJC" and "Individual members of NSPE had no more voice in the decision to reject the EJC invitation than did members of ASCE or ASME in the decision to issue the invitation" just aren't true, at least in the Texas part of NSPE. This question of a unity organization has been discussed in the local chapters for over three years and at the October meeting of the TSPE executive Board of Directors, we voted our disapproval of joining EJC and so instructed our NSPE Director. The TSPE Board is composed of the officers, six directors at large, and one director elected from each local chapter, which makes it a very representative organization.

As for the member societies of EJC, I understand that AIEE is the only society where the membership was polled regarding a unity plan. I know that the membership of the Texas section of ASCE had no opportunity to vote on this question.

Your statement that EJC is much more representative of the engineers of this country than is NSPE, is a very debatable question. Within the framework of EJC, the various societies have a larger membership, but to say that EJC is representative of the engineers of the nation is questionable. I cannot understand how an organization that does not have a method of determining the desires of its membership, can be said to represent the engineers of the country.

Frankly, as a long time reader of ENGINEERING NEWS-RECORD, I am quite concerned about the extensive editorial comments about engineers and engineering problems that have been carried recently, especially when such positive conclusions are arrived at from such obviously limited information and study.

L. V. NORRIS
Consulting Engineer,
Beaumont, Texas

SIR: I am writing concerning the editorial "Less Unity for Engineers" (ENR Dec. 10, 1953, p. 172). I have liked very much the editorials that you have presented for they show an understanding of the problems of the engineering profession pertaining to unity and collective bargaining.

I am active in both the ASCE and NSPE and therefore feel qualified to discuss the editorial referred to above. I take exception to the statement made in the fourth paragraph of the editorial in which it is stated that the individual members of NSPE had no more voice in the decision to reject the EJC invitation than did the members of ASCE. My experience with NSPE is that it is definitely a grass roots organization and that no decisions are made at the national level without a vote being taken at chapter meetings. The chapter vote is forwarded to the state level and as a result the state directors to the NSPE Board of Directors are obligated to vote on questions, such as unity, as they are instructed. The ASCE has no such procedure. The local chapters are asked the advice on

(*Continued on page 14*)

NEW!

RIPPER TEETH

POST HOLE AUGERS

COATED TUBE STOODITE

(STOODY 1293)

"High Alloy" Wear — Low Cost — Faster Deposition . . .

a better rod for hard-facing carbon, manganese and all other steels.

CARRYING SCRAPERS

SHOVEL BUCKETS AND TEETH

Here's where your search ends for better wear resistance at low cost! The new COATED TUBE STOODITE gives you everything*... more wear protection, more impact strength, faster deposits, better weldability!*

Field tested two full years, we're sure of our answers*... It's actually doing the work of rods costing twice as much!*

Try 50 lbs. today—compare it with rods of any price! See your Stoody dealer (listed in the "yellow pages" of your phone book) or write for literature.

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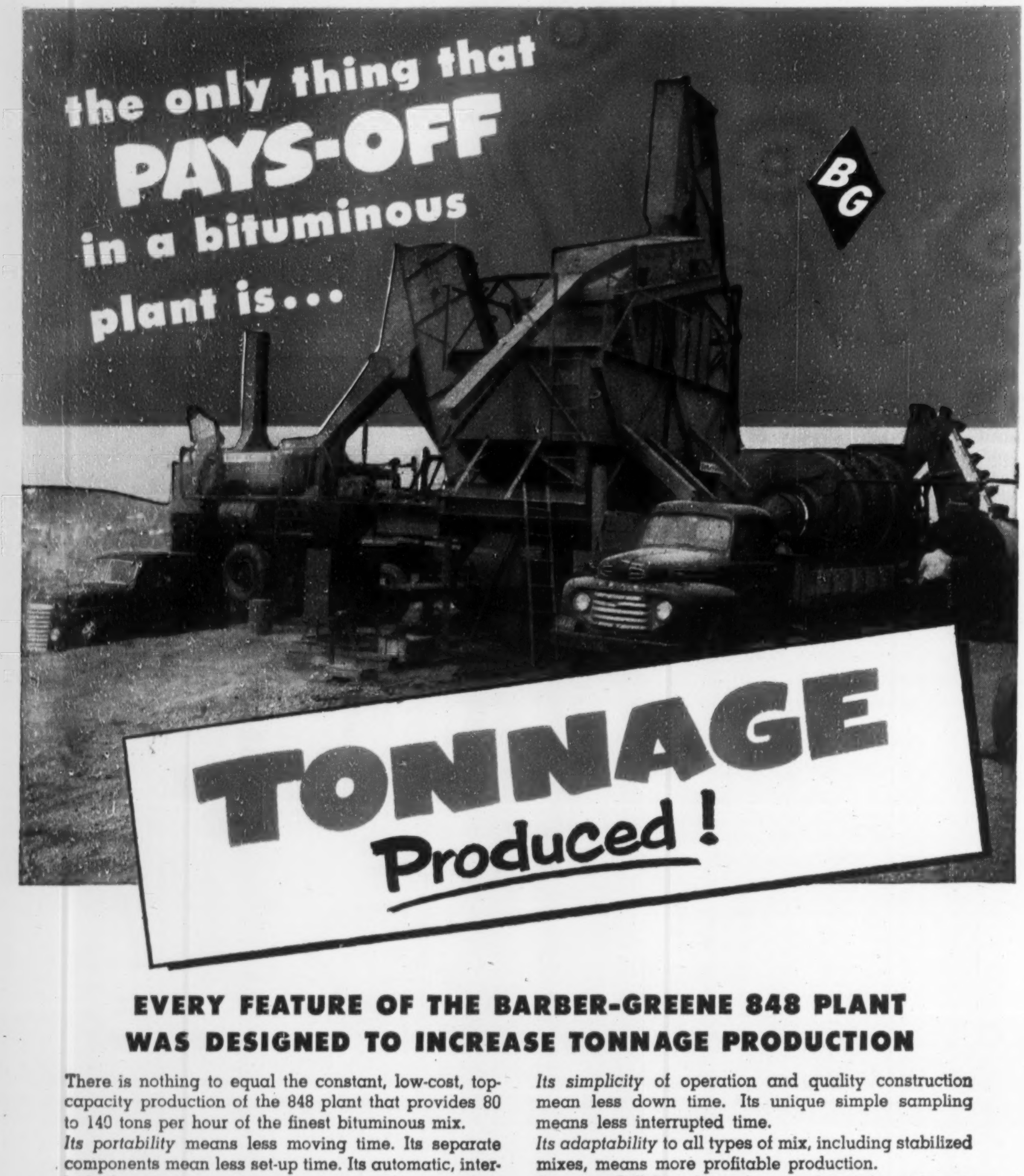

EVERY FEATURE OF THE BARBER-GREENE 848 PLANT WAS DESIGNED TO INCREASE TONNAGE PRODUCTION

There is nothing to equal the constant, low-cost, top-capacity production of the 848 plant that provides 80 to 140 tons per hour of the finest bituminous mix.

Its portability means less moving time. Its separate components mean less set-up time. Its automatic, interlocked operation assures accuracy and means less loss due to the human element.

Its simplicity of operation and quality construction mean less down time. Its unique simple sampling means less interrupted time.

Its adaptability to all types of mix, including stabilized mixes, means more profitable production.

See your B-G Distributor for complete information on the high capacity 848 Bituminous Plant.

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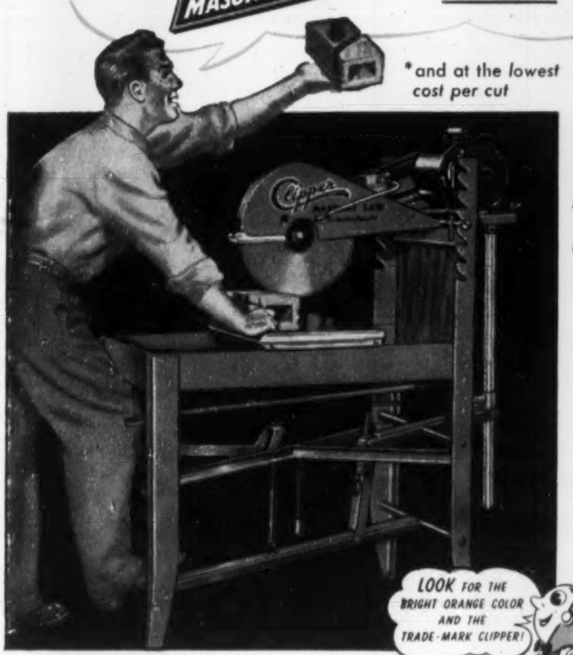
A... Clipper "SAILS RIGHT THRU" ® MASONRY SAW ... WILL CUT THE HARDEST **BRICK–STONE–TILE!***

*and at the lowest cost per cut



AND A... Clipper "SAILS RIGHT THRU" ® MASONRY SAW

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HERE'S WHY!...The DUSTLESS Clipper operates right beside your bricklayers because the Clipper is PORTABLE... easily moved from basement to roof. One Clipper Model HD with a Clipper Diamond Blade will do the cutting of 3 ordinary abrasive saws! This is possible *ONLY* with such Patented Clipper features as...the Pressure Equalizer Spring, the Famous Select-A-Notch, Water Application System, and Adjust-A-Cut which makes possible One-Spot Operation.

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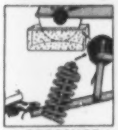
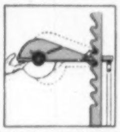
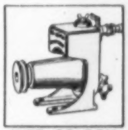


PRESSURE EQUALIZER



SELECT-A-NOTCH



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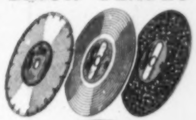
TODAY!...Try the New—Faster Cutting—Economical CLIPPER SUPERIOR BLADES

... guaranteed to "Consistently Provide the fastest cut...at the lowest cost...with the greatest ease!" Clipper alone can supply *all* specifications of Abrasive, Diamond and "CBR" (Break-Resistant) Blades to accurately meet your requirements. INVEST IN CLIPPER and YOU'LL GET RESULTS!



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IT'S YOURS ON...FREE TRIAL!

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OUR ONLY BUSINESS FOR NEARLY 20 YEARS... MASONRY & CONCRETE SAWING!

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SAW BEFORE BREAKING WITH A CLIPPER CONSAW!

Save up to 50% in labor and material. Saw repair patches—gas, water, sewer and air line trenches in floors, streets, walks, runways and highways. Save, too, by sawing contraction joints—eliminate costly hand forming and spalling.

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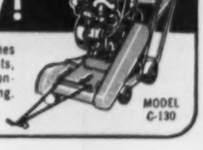

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(97)

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WATER Paces Gary's Business Growth!

Allis-Chalmers Helps Indiana's Fastest

INDIANA'S FASTEST GROWING CITY knows that an adequate water supply is necessary for future growth. Gary, one of America's few planned cities, has zoomed to its present 135,000 population (Indiana's second greatest) in less than 50 years.

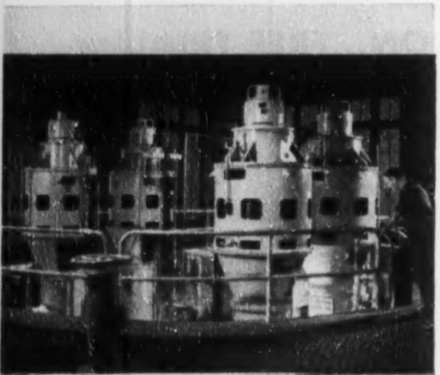
And planning for a still bigger future, Gary recently installed these Allis-Chalmers pumps and motors to create capacity adequate for population *doubling!* With over 123 local industries — including the world's largest complete steel mill, sheet and tin mill, and cement plant — Gary is wise to allow for plenty of future growth.

The Gary-Hobart Water Corporation operation also is unusual in that all city water comes through a Lake Michigan suction tunnel 6 ft in diameter and *three miles long.* When power fails, this moving column of water can cause a surge flooding the main pumping station.

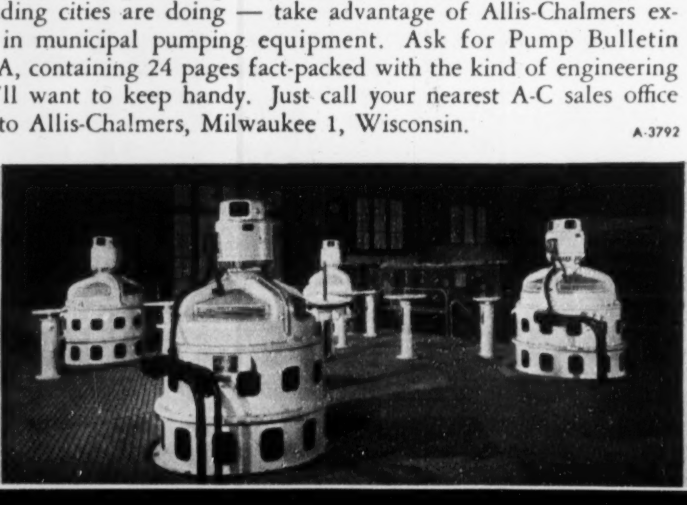
With the original horizontal pumping units, a surge rendered motors inoperative for some time. The four new Allis-Chalmers vertical mixed flow units were made 57 ft long so that the impellers are kept submerged despite "draw down" and yet the 350 hp motors cannot be flooded. Fifteen foot extensions protect the motors for the four high head units.

When *your city* plans expansion or modernization, do as Gary and other leading cities are doing — take advantage of Allis-Chalmers experience in municipal pumping equipment. Ask for Pump Bulletin 08B6146A, containing 24 pages fact-packed with the kind of engineering data you'll want to keep handy. Just call your nearest A-C sales office or write to Allis-Chalmers, Milwaukee 1, Wisconsin.

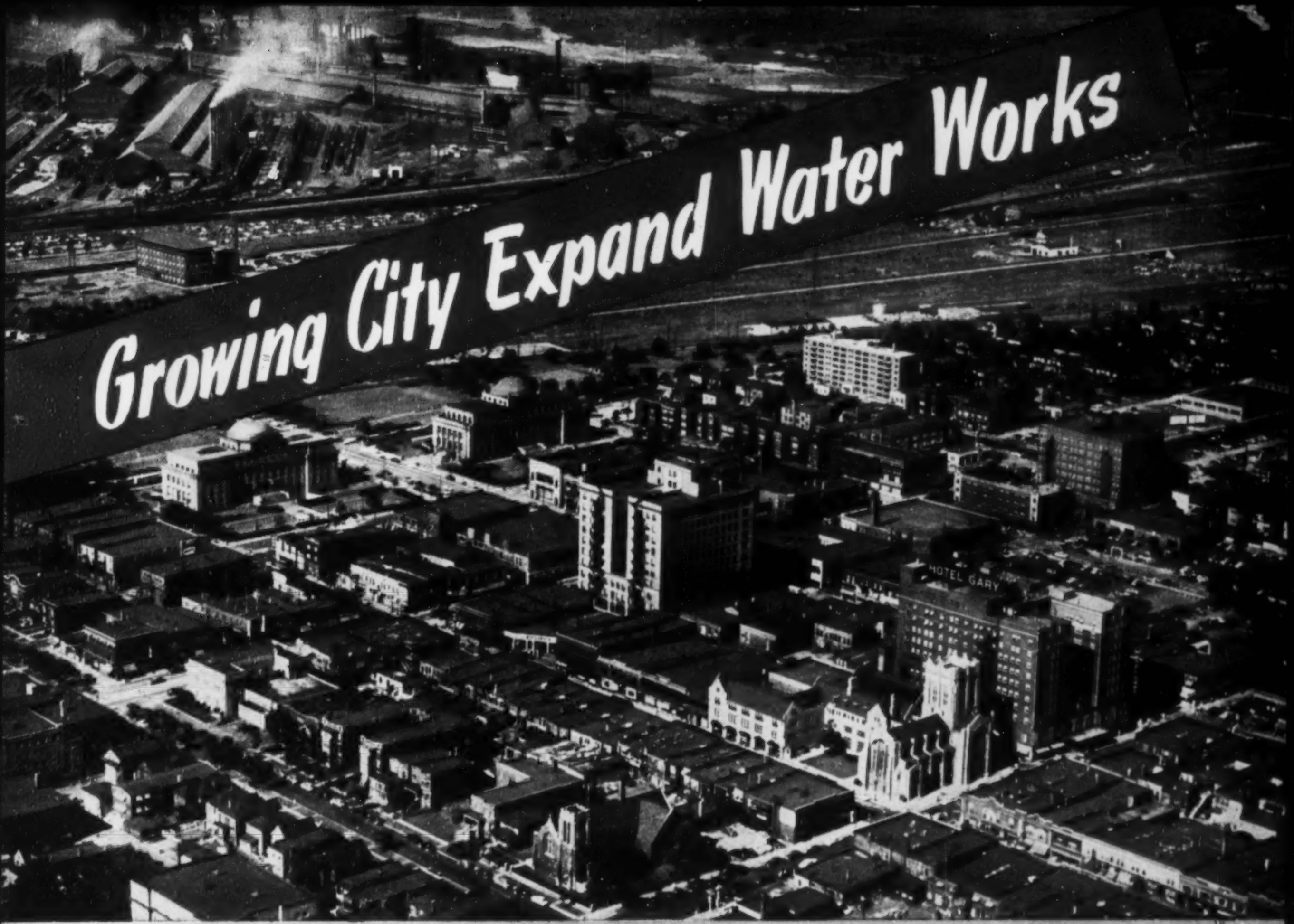
A-3792



LOW LIFT PUMPS in the 100 ft deep well at tunnel's end are 36 x 24 in. mixed flows, each rated 15,000 gpm against 50 ft head; driven by 350 hp, 720 rpm synchronous motors. Units were made 57 ft long to avoid motor flooding in case of power failure. In 1951, Gary's peak pumpage rate for one hour was 44 M.G.D.

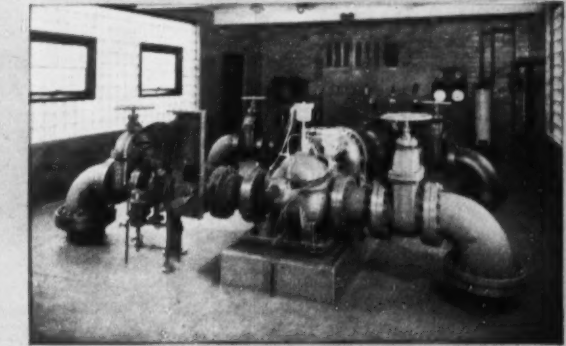


HIGH HEAD PUMPS are 24 x 18 in. centrifugals, each rated 14,000 gpm against 160 ft head; driven by 700 hp, 720 rpm synchronous motors. The high head units pump directly into the mains, operating in series with the mixed flow pumps. Special 15 ft high barrel type supports keep the motors out of flooding danger.



METROPOLITAN GARY, the planned city built on the sand dunes at the lower end of Lake Michigan. Portions of steel mills and lake are seen in the distance.

GREAT FLEXIBILITY at the main pumping station is provided by the header and valving arrangement. Operation can be varied from only one high head unit in service — pumping directly from well to mains and adequate for light loads — to all eight units pumping simultaneously — adequate for Gary population doubling.



GLEN PARK BOOSTER STATION is also exclusively Allis-Chalmers. These two 12 x 12 in. centrifugal pumps are each rated 3200 gpm against 115 ft head; driven by 50 hp, 1160 rpm induction motors. To maintain constant pressure, they are automatically remote-controlled from the water tower.

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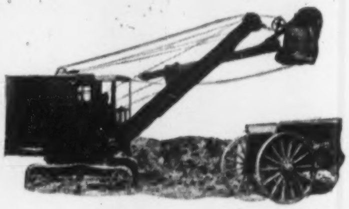
You can always rely on equipment carrying the distinctive UNIT emblem. Backed by more than a quarter century of engineering and manufacturing experience, this well-known trademark signifies progress in crane and shovel design. It is your guarantee of obtaining the finest and most dependable equipment that money can buy.

1930 — Every UNIT was equipped with ONE PIECE GEAR CASE, enclosing all gears, shafting and bearings in a constant bath of oil. Also featured was the CLUTCH SHAFT ASSEMBLY, using Disc Type Interchangeable Clutches and "Straight-in-line" engine mounting. Reduces maintenance. Improves performance.



1939 — Introduced AUTOMATIC TRACTION BRAKES. These internal expanding friction type brakes, engage and release automatically and provide traction lock without manual control. Steering is accomplished by single lever control.

1944 — Yes 10 years ago, UNIT made the "break" from the old style conventional type of cab to the UNIT FULL VISION CAB. The compact design of the upper structure enabled UNIT to make this decided improvement, giving the operator 360° of complete visibility. This exclusive feature was designed *into* the machine . . . not just tacked on.

1954 — Bring NEW DEVELOPMENTS such as: UNIT with TORQUE DRIVE — SOLENOID ACTUATED DIPPER TRIP — ALUMETALLIC CLUTCHES — Latest Crane Carrier Design and other UNIT features described in Bulletin U-1153. Write for your copy.

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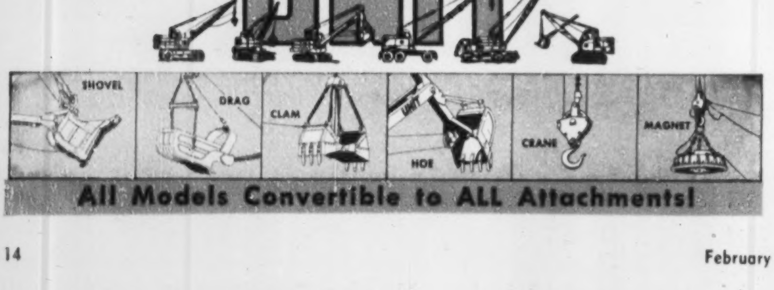

All Models Convertible to ALL Attachments!

certain problems such as unity, but there is no direct obligation on the National Board of Directors to consider the feeling of the members.

I personally was one who voted to reject the EJC invitation, at least temporarily until we could find out more about the conditions of membership that would be imposed upon NSPE.

Again, I should like to have you continue your editorials covering the engineering profession.

C. W. Britzius
Twin City Testing and
Engineering Laboratory
St. Paul, Minn.

[Editors Note—We may have oversimplified a somewhat involved situation, but as we understand the NSPE set-up, the directors of NSPE, like the members of EJC are under no obligation to consult the membership. NSPE directors can, and do, act on important matters without checking with the state societies, and local chapters as to their views. They can ask for the opinions of the local groups as they did on the Unity issue, but so can the officers of the societies that make up the council of EJC.]

Compensation facts

Sir: In the Dec. 17 issue of Engineering News-Record, (p. 28) there was an article in regard to the position of contractors under the present Unemployment Insurance Law in New York State. Many of the points made in the article brought into sharp focus some administrative matters of which employes and employers are well aware, but I though I should like to drop you a note and call to your attention some errors which is in the third paragraph of the article on page 28.

The maximum, under the present law, is $30 instead of $32 per week. Contrary to popular opinion, all of the funds from which unemployment insurance benefits are paid in our state, are collected from the employer. The employe pays nothing toward the unemployment insurance funds. In the article, it says that an employe must have been "continuously employed in 'covered' work for a period of 20 weeks prior to the layoff." The facts are that he is not required to have been continuously employed but must have had a total of 20 weeks of "covered" employment in the base year.

The unemployment insurance law

(*Continued on page* 18)

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for over 57 years...

Structural Steel Bridges, because of their proved strength, durability, adaptability and safety, are regularly SPECIFIED by experienced engineers for our modern highway systems.

Fort Pitt Bridge—because of its many years of practical experience and complete engineering and production facilities—is regularly selected for the fabrication and erection of many of these fine steel structures.

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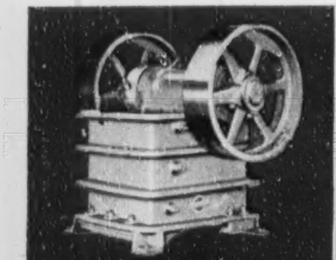
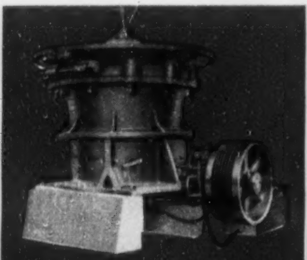
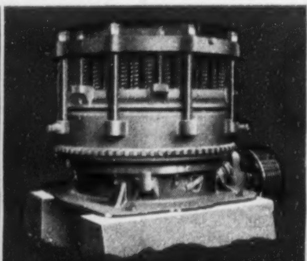


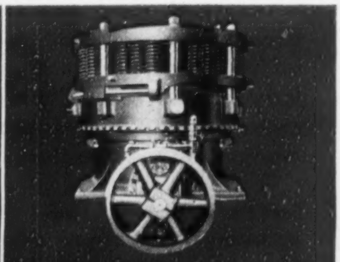
JAW CRUSHERS



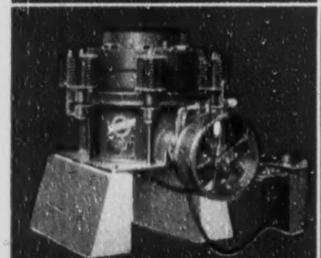
GYRATORY BREAKERS



COARSE GYRASPHERES



FINE GYRASPHERES



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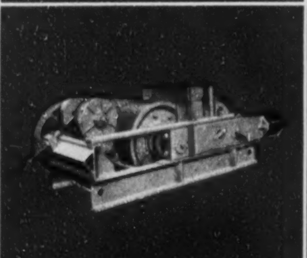
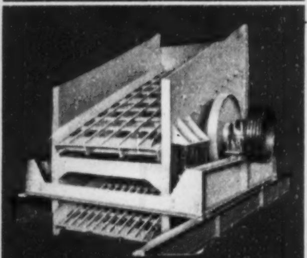
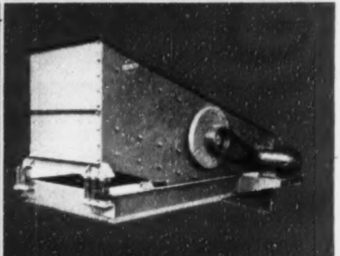


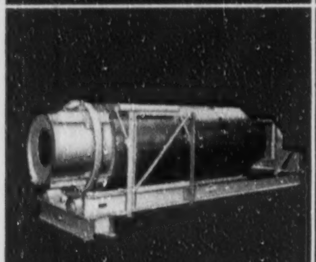
DOUBLE ROLL CRUSHERS



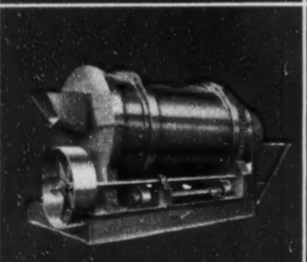
HEAVY DUTY SCALPERS



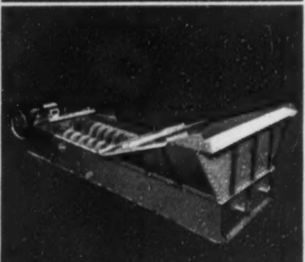
VIBRO-KING SIZING SCREENS



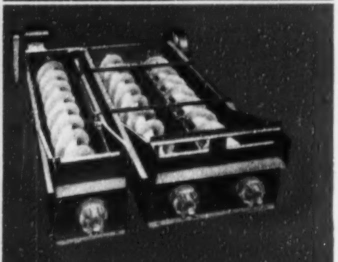
WASHING SCREENS



SUPER-SCRUBBERS



SAND CLASSIFIERS



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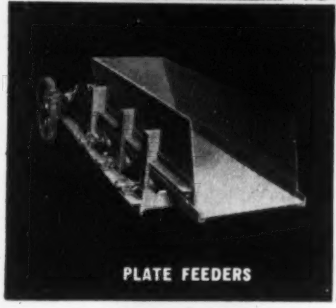
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ON YOUR EQUIPMENT

Is your plant, and particularly its equipment so designed and built that it meets all your deposit and market needs? Is capacity high . . . and upkeep low? Does it pay the profits it should for the money you have invested? These are the *equipment facts* you're looking for. You'll find them in this guide. All the latest data on the newest equipment—Telsmith-engineered, modern, flexible, and the right type, model and size to turn out quality aggregate in quantity, at low cost.

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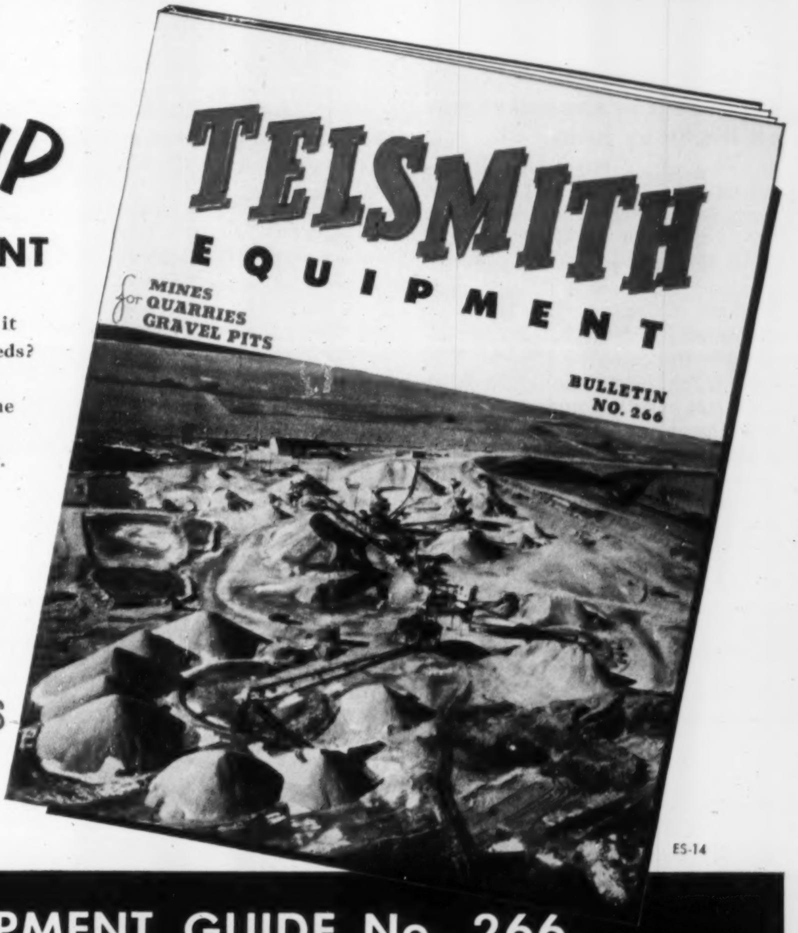
Consult TELSMITH Engineers

let them relieve you of technical detail in plant planning and equipment selection.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ES-14

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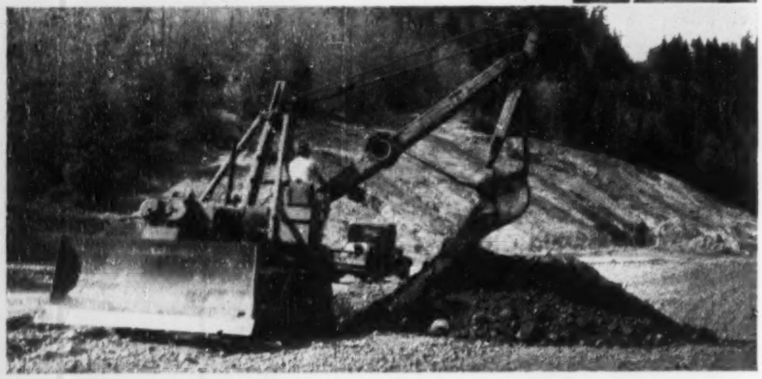
No cost . . . No obligation

"HYSTAWAY® gets hard-to-get-at jobs done in a hurry"

says Adolph Bauer, Superintendent
A.Teichert & Sons, Inc., Engineering Contractors



Tractor-mounted excavator crane cuts cost on highway jobs

Working on a divided highway relocation project near Dunsmuir, California, A. Teichert and Sons, Inc., contractor on the job, hit a major drainage problem and tough digging.

Much of the trenching for catch basins and culvert had to be finished in the completed grade. This often meant hard digging to a depth of 14 feet in fully compacted fill. At some locations it was necessary to dig close to the slope of the fill—from digging positions that would be impossible for full-revolving type excavating machines.

A Hystaway mounted on a Caterpillar® D7 Tractor was used to put in *all* of the culvert. Said Adolph Bauer, Job Superintendent: "The Caterpillar-Hystaway combination is the handiest tool on the job. It makes its own trails and gets those hard-to-get-at jobs done in a hurry."

Hystaway mounts easily on new or used Caterpillar track-type tractors—cuts cost on highway jobs.

Heavy-duty Cat® Diesel Engine gives Hystaway *more power* than any other ½ yard revolving shovel—which means less stalling, and fewer hang-ups.

With Hystaway you *dig and bulldoze* with one machine—travel at tractor speeds, even over rough terrain—dig in close quarters.

See your Caterpillar-Hyster® Dealer for details, or write: Hyster Company, 2953 N. E. Clackamas, Portland 8, Oregon; 1853 N. Adams St., Peoria, Illinois.

HYSTER COMPANY

There's PROFIT in HYSTER POWER

Hystaway Excavator-Bulldozer combination speeds highway maintenance jobs, too.

probably is one of the most technical and complex that we have on the statute books at the present time. Many employe organizations and many members of management are very well pleased with the administration of the present law. We have observed that many members of organized labor and of employer groups are doing a wonderful job of getting the facts straight and of pointing out the real improvements that were made in the 1951 amendments to the law. We have a real challenge in doing everything we can to see that the true picture is being presented; therefore, I thought I should like to let you have my reaction to the article in your December issue.

GAYLORD W. HYMEN
Director, Personnel Relations
Cooperative Grange League
Federation Exchange, Inc.
Ithaca, N. Y.

Transit systems can work

SIR: In your publication of January 7 (p. 14) I read a letter from Don V. Purington of Houston, Tex.

Mr. Purington is definitely on the right path, but his point is one that is seldom aired. From some personal professional experience I can furnish the answer to the question Mr. Purington asks and some he implies.

First of all, transportation is an accessory to the urban way of life. Viewed in this light, transportation must serve other functions, not dominate them, and the transportation machine must serve men, not dominate them.

Next, it is no surprise to any engineer to find that of the many devices available of which to fashion an urban transportation machine, no one by itself is adequate. What is needed is a combination of parts, assembled with discrimination.

Third, it is entirely practicable in any urban area to build a transportation plant composed of freeways, parking space, trains, subways, buses and trolleys, using each for the uses which it can serve better than all others. Such a plant will require considerable coordination in design, extensive use of joint facilities for the several components of the transportation plant and, above all, a realization of the need to have the transportation function serve, rather than dominate the other functions of the city.

Fourth, it is found that such a rationally designed transportation machine will involve a very sparing use of the power of eminent domain, very little disruption of community activi-

(Continued on page 24)

NOW!

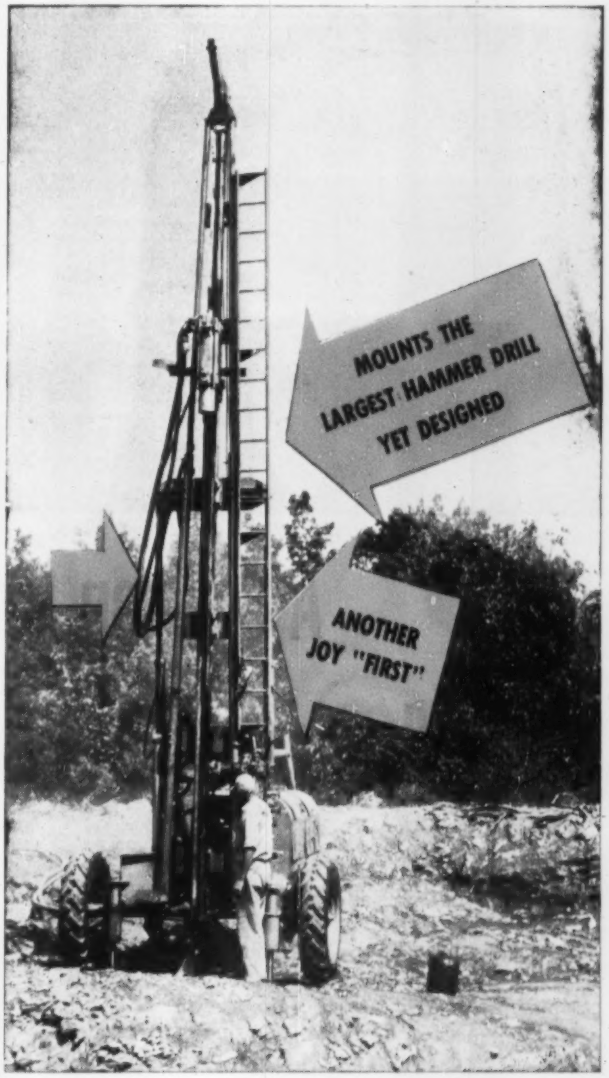
you can get big drill performance with the

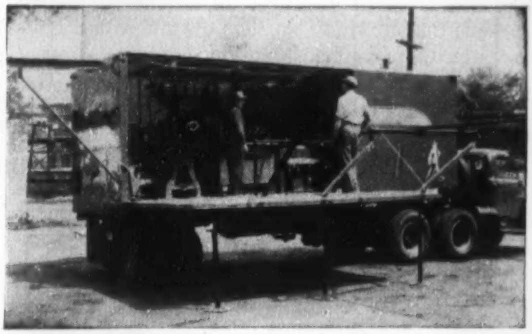
CHALLENGER Blast Hole Drill

HERE'S WHAT USERS SAY:

"Drilling cost per ton of ore broken reduced by two-thirds over wagon drills. Driller experience can further reduce to one-sixth of wagon drilling cost."

"Punched down four 60′ holes, bottoming at 4″ dia., in one shift. What a drill!"





SPECIAL DRILL AND STEEL SERVICE

The size of the Challenger Drill and the sectional steel used with it, makes necessary special drill and steel service which is provided by Joy. Service trucks, like the one shown here, make periodic visits in areas where Challenger Drills are operating. The operators of this "mobile shop" are experienced drill doctors who furnish complete drill steel service, bit sharpening service, drill inspection, and suggestions for use and application of the drill for best results.

Users' reports on early units show that you really get big drill performance with the Challenger Drill. It's a 5¼″ hammer drill (not a piston drill) that drills 4½″ diameter holes through hardest rock to depths of 50′ or more. This big drill performance calls for a 26′ feed to cut the number of steel changes, and a self-propelled mounting. Tractor-mounted on rubber tires with a portable compressor to furnish air for drilling, the Joy Challenger is the biggest cost-cutting big drill for hard rock drilling. Check your needs . . . see if this big drill won't answer your problems. ● ***Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.*** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

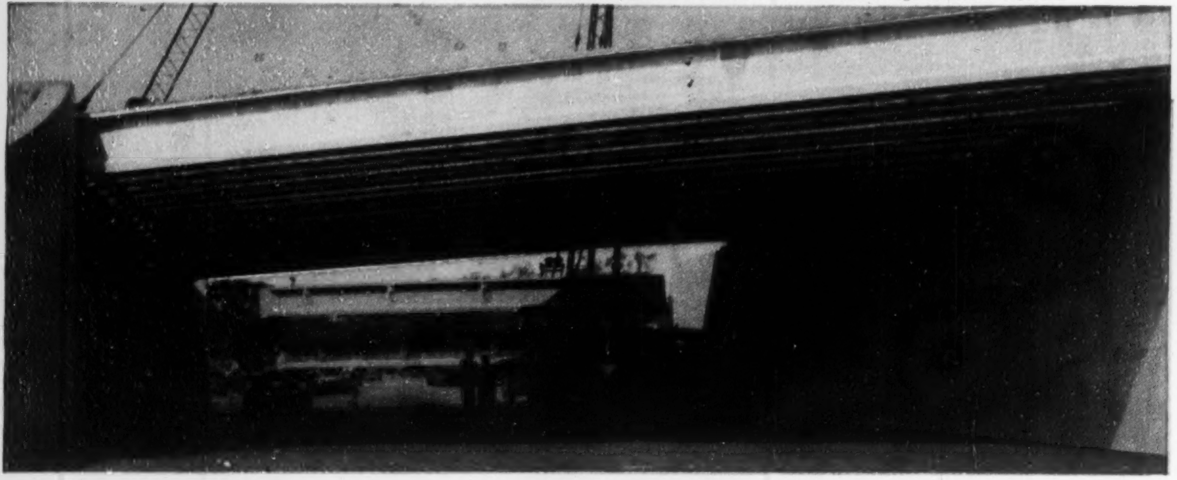
Consult a Joy Engineer

JOY

WORLD'S LARGEST BUILDER OF CORE DRILLS, ROTARY BLAST HOLE DRILLS AND MOTORIZED DRILL RIGS

W&D C 4838

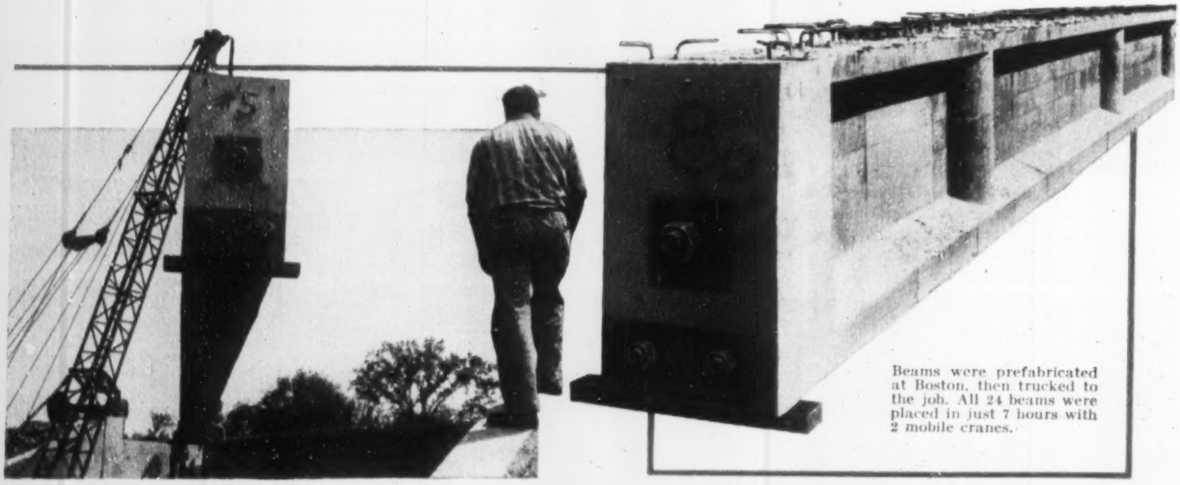
Prestressed supporting beams were specified for Scotland Road Bridge, just north of Boston, Massachusetts, to provide extra strength and maximum resistance to cracking. After rigorous tests, no beam for this bridge has been rejected.



American Special High Strength speeds construction, increases strength

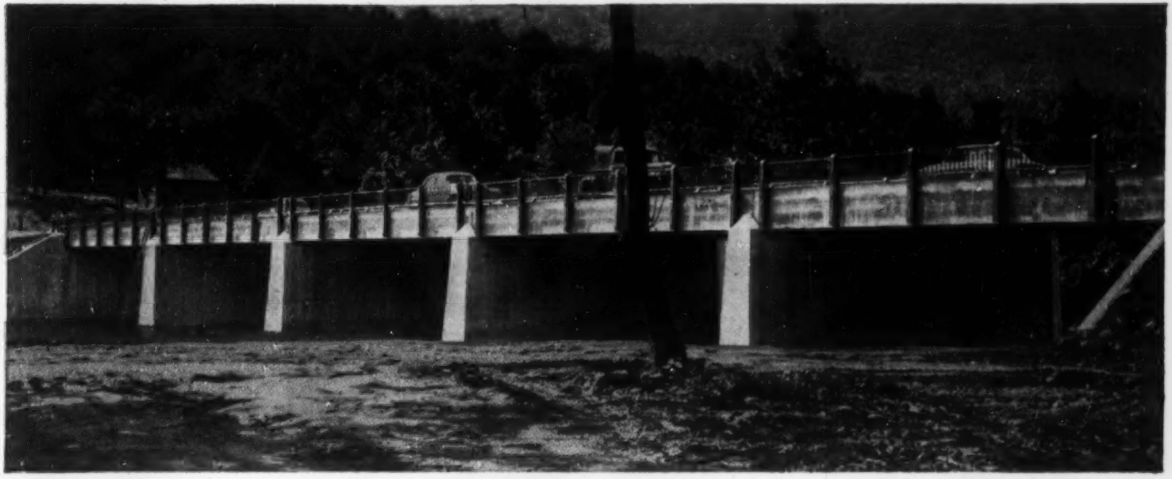
IN MASSACHUSETTS, seven important new highway bridges are being built with prestressed concrete. One of these is Scotland Road Bridge which will handle the bulk of traffic between Boston and the New Hampshire and Maine turnpikes. Extra strength and durability, as well as exceptional resistance to cracking, were built into this bridge by using prestressed concrete bridge beams reinforced by post-tensioning American High Strength Reinforcing Strand.

The slab road surface rests on 24 prestressed H-beams that were designed and manufactured by New England Concrete Pipe Corporation. Each beam is 66 ft.-4 in. long, 3 ft.-6 in. deep and 1 ft.-6 in. wide at the flanges. It contains three 1 9/16″, 61-wire American Special High Strength Reinforcing Strands (not strain relieved) that are cut to length at the mill with end fittings attached and are post-tensioned to a final stress of 110,000 psi. by the manufacturer of the beam. This stress is 50% of the strand's ultimate strength . . . and more than 5 times as great as the 20,000 psi. allowed for ordinary concrete reinforcement. Post-tensioning keeps the concrete under compression, prevents destructive cracking, reduces maintenance, and increases the useful life of the concrete. The 24 beams for Scotland Road Bridge were installed in just 7 hours.



Beams were prefabricated at Boston, then trucked to the job. All 24 beams were placed in just 7 hours with 2 mobile cranes.

Each of the beams in this prestressed concrete bridge at Glen Iron, Pennsylvania contains eighty ¼-in American Special High Strength Reinforcing Strands. The beams for all 5 spans were erected in less than 6 days.



Reinforcing Strand of *Prestressed* concrete bridges

IN PENNSYLVANIA, more than 125 concrete highway bridges have been built with Pretensioned-Prestressed Concrete Bridge Members manufactured by Concrete Products Co. of America, Division of American Marietta Co. These extra strong bridge members all are reinforced with American Special High Strength Reinforcing Strand regular grade (not strain relieved).

The largest of these bridges, shown above, was erected in 1952 at Glen Iron, Pa. It contains 45 Pretensioned-Prestressed Members that are reinforced with ¼" diameter American Special High Strength Reinforcing Strand. Each beam is 53 ft. long, 3 ft. wide, and 33 inches deep.

These pretensioned bridge beams require only about one-fourth as much steel as conventional reinforced concrete bridge members; they resist cracking better; yet they cost about *25% less,* installed, than conventional members of equivalent strength. In tests, these pretensioned beams withstand loads 3 times greater than those required by Standard Specifications for Highway Bridges.

American Steel & Wire has been the pioneer in furnishing special reinforcing strand for pretensioning systems of prestressed concrete in both regular and strain relieved grades.

Why American Special High Strength Reinforcing Strand was chosen for these bridges

1. It has good creep resistance, as well as a high ultimate strength of 238,000-268,000 psi. depending on wire size.
2. It is flexible and easy to handle.
3. It bonds firmly with the concrete when small diameter strands are used.
4. It assures consistent results . . . is uniform in size, strength and ductility.

Write for complete information about American Special High Strength Reinforcing Strand. American Steel & Wire, Room 842, Rockefeller Building, Cleveland 13, Ohio.

AMERICAN STEEL & WIRE DIVISION · UNITED STATES STEEL CORPORATION · GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS · TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

U·S·S AMERICAN *Super-Tens* WIRE *and* REINFORCING STRAND

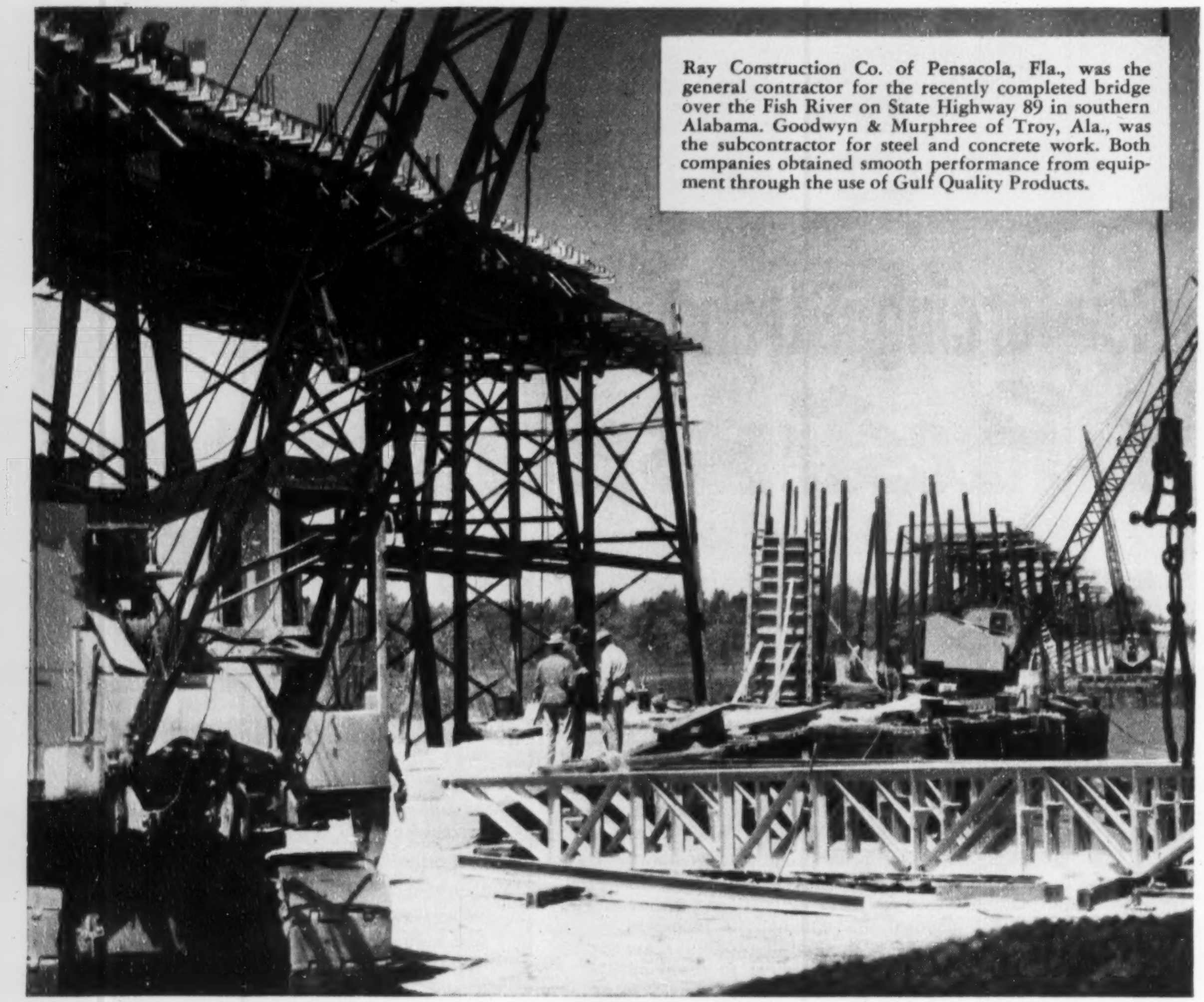
USS

UNITED STATES STEEL

GULF PRODUCTS *and* FINE SERVICE

keep equipment rolling

on Alabama Bridge Project



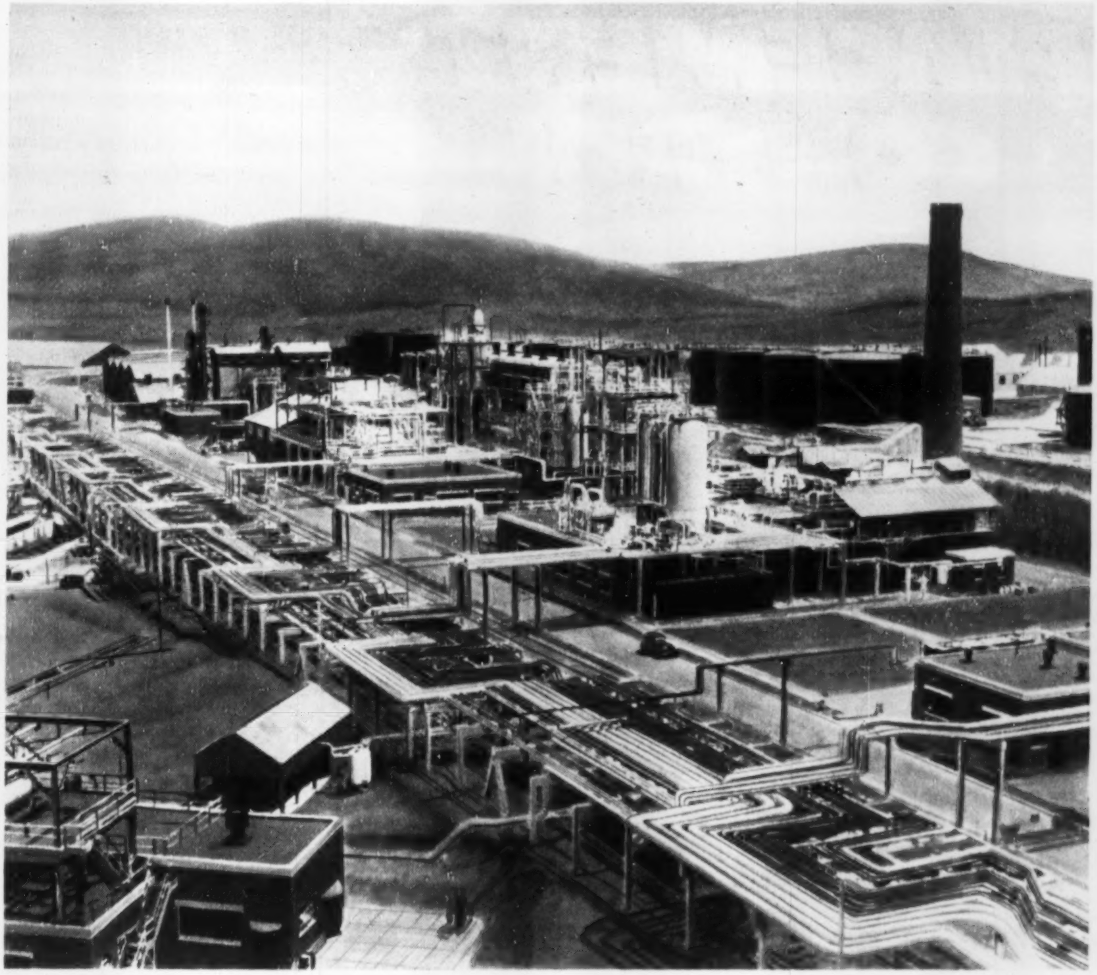
Ray Construction Co. of Pensacola, Fla., was the general contractor for the recently completed bridge over the Fish River on State Highway 89 in southern Alabama. Goodwyn & Murphree of Troy, Ala., was the subcontractor for steel and concrete work. Both companies obtained smooth performance from equipment through the use of Gulf Quality Products.

WITH higher-than-ever operating costs threatening every dollar of profit, it will pay you to take stock of the advantages of Gulf Service and Gulf Petroleum Products.

Advantages like these, for example: Quality lubricants that provide an extra margin of protection for every gear and bearing; fuels that insure full power for every engine; expert petroleum engineering counsel; and prompt delivery service. You'll find, as have so many leading contractors, that they all add up to fewer mechanical delays, lower maintenance costs, and an all-round smoother operation.

Let us discuss with you how our products and services can help you on your next job. They are available to you through more than 1400 warehouses in 31 states from Maine to New Mexico.

GULF



ON A HILLSIDE IN SOUTH WALES

Llandarcy, the Anglo-Iranian Oil Company refinery situated on a hillside near Neath, South Wales, has grown since 1946 from 360,000 tons to 4,000,000 tons capacity per year.

In this development program Badger Process Division of Stone & Webster Engineering Corporation, and its affiliate, E. B. Badger & Sons Limited, have played a major part.

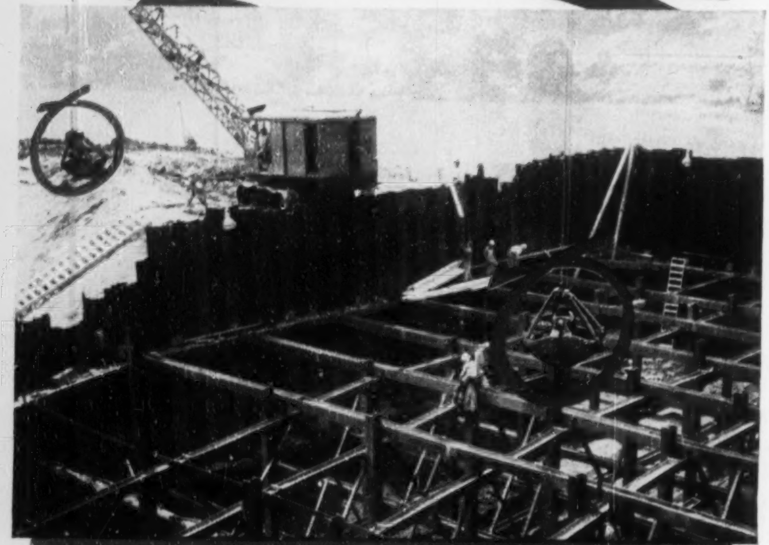
Some of the new and modern facilities already completed or under construction are crude distillation, catalytic reforming, propane deasphalting, furfural extraction, solvent dewaxing, wax manufacturing and clay treating.

STONE & WEBSTER ENGINEERING CORPORATION

BADGER PROCESS DIVISION

AFFILIATED WITH E. B. BADGER & SONS LIMITED

PLACEMENT CONTROL



AN OWEN FEATURE

The placing of a bucket in a narrow trench or caisson; or between closely spaced cribbing requires skill.

Whether it "lands" properly to assure efficient digging is largely a matter of correct bucket design.

Many an operator prefers Owen Buckets because they respond readily to his efforts — go where he wants them to go — and land in unseen places in an upright position ready to take a tremendous bite.

It's largely a matter of design — proportioning and balance, all of which are built into every Owen Bucket as a result of decades of "know-how" based on specialized experience.

AN ARMFUL
AT EVERY GRAB

THE OWEN BUCKET CO.

6010 Breakwater Ave., Cleveland 2, Ohio

BRANCHES: NEW YORK, PHILADELPHIA, CHICAGO, BERKELEY, CALIFORNIA, FT. LAUDERDALE, FLORIDA

ties, relatively little capital outlay, few conspicuous monuments, few headlines and little patronage. Furthermore such an approach to the problem also has a chance to result in a reasonably satisfactory solution, whereas any attempt to find a single "cure-all" automatically creates the next bottle-neck.

Fifth, it will be equally obvious that a basic design criterion must be the need for comfort and convenience that will lead the customer, exercising free choice, to use the facilities in the manner intended by their designer.

Sixth, the design of a transportation plant along the lines indicated above will save the taxpayers' money, but the unfortunate part of this phase of the job is that the taxpayers are not as interested in their money as sometimes is implied.

Viewed from the engineer's position, the percentage fee paid on wholesale demolition is the same as that paid on the less costly "scalpel" approach to the problem. But the skill demanded to wield a scalpel is more, and more costly than that required to wield a meat cleaver. And the taxpayers simply do not know the difference, and few care to learn.

My own experience is reasonably typical. I can secure all the employment I can use in participating in the design and construction of facilities involving wholesale demolition and spectacular construction. But a design involving a combination of facilities, to furnish the users with better service at less cost, and sparing use of the wrecking contractor is virtually unsalable. I have come to the conclusion that the smaller sums of public money involved are themselves the objectionable feature.

JOHN G. KNEILING
Staten Island, N. Y.

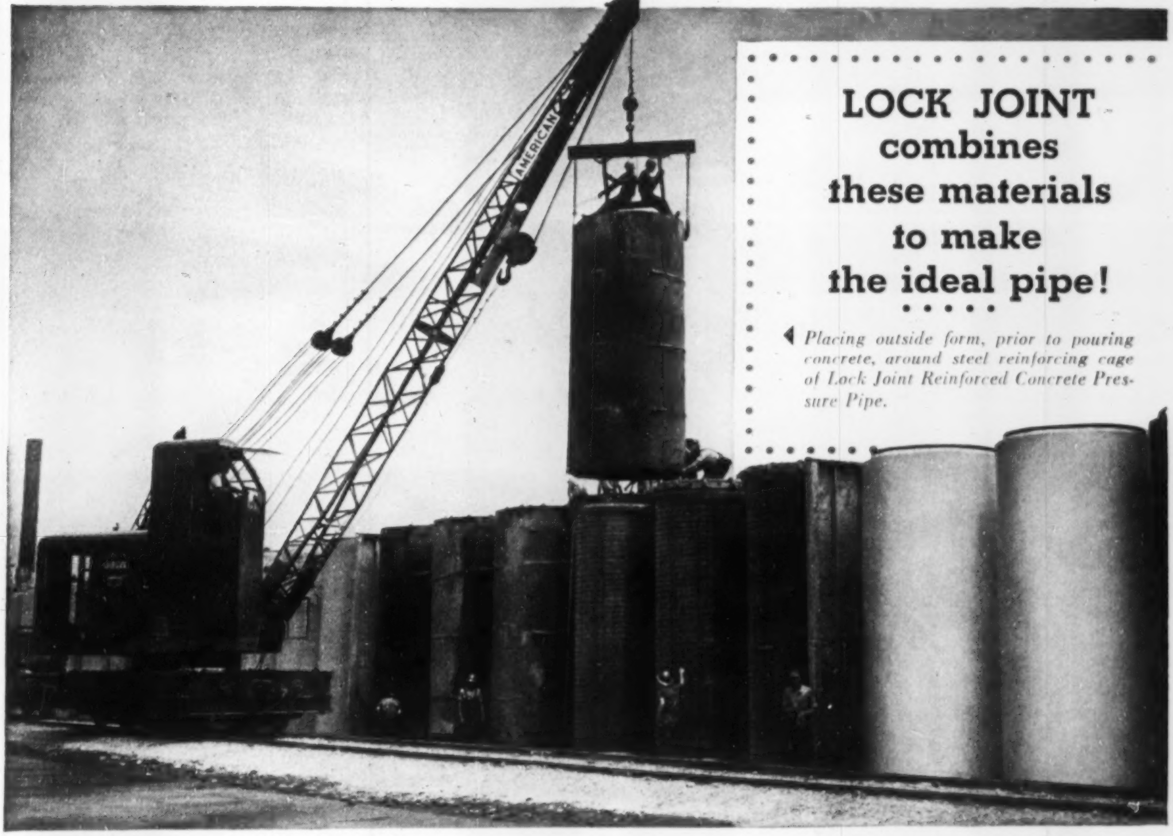
New code offers solution

SIR: Mr. Merritt's article, "Code confusion: It hampers wall design," (ENR Dec. 24, 1953, p. 21) points to an important fault to be found in many codes, which, because of their legal framework, are too inflexible to cope with modern trends in design and construction.

The New York State Building Code Commission, by fortunate foresight on the part of the governor and legislature, is not hampered by obsolete code concepts. Consistent with accepted principles of fire protection, it permits exterior wall panels having no greater rating than that of glass, in its new code applicable to multiple dwellings.

(*Continued on page 29*)

There's no substitute for
CONCRETE and STEEL!



LOCK JOINT
combines
these materials
to make
the ideal pipe!

Placing outside form, prior to pouring concrete, around steel reinforcing cage of Lock Joint Reinforced Concrete Pressure Pipe.

CONCRETE, with its proven qualities of durability, non-corrosion, resistance to electrolytic action, and high compressive strength is combined, by Lock Joint, with steel's toughness, resilience and high tensile strength to make a pipe that retains the best qualities of both—non tuberculance, high structural strength and long life with little or no maintenance. Dense concrete affords complete protection for the quality reinforcing steel. Both materials are carefully calculated to meet your pressure needs with a wide factor of safety. The Lock Joint Pipe Company's Rubber and Steel Joint is extremely watertight and, at the same time, flexible.

For superior strength, carrying characteristics and trouble-free operation, let Lock Joint supply your pipe needs in sizes 16" and larger.

SCOPE OF SERVICES—*Lock Joint Pipe Company specializes in the manufacture and installation of Reinforced Concrete Pressure Pipe for Water Supply and Distribution Mains 16" in diameter or larger, as well as Concrete Pipes of all types for Sanitary Sewers, Storm Drains, Culverts and Subaqueous Lines.*

LOCK JOINT PIPE COMPANY
Established 1905
P. O. Box 269, East Orange, N. J.
PRESSURE PIPE PLANTS: Wharton, N. J., Turner, Kan., Detroit, Mich., Columbia, S. C.
SEWER & CULVERT PIPE PLANTS:
Casper, Wyo. • Cheyenne, Wyo. • Denver, Col. • Kansas City, Mo. • Kennett Square, Pa. • Valley Park, Mo. • Chicago, Ill. • Rock Island, Ill. • Wichita, Kan. Kenilworth, N. J. • Hartford, Conn. • Tucumcari, N. Mex. • Oklahoma City, Okla. Tulsa, Okla. • Beloit, Wis. • Hato Rey, P. R. • Ponce, P. R. • Caracas, Venezuela

LOCK JOINT
Reinforced Concrete
PRESSURE PIPE

1
2
3
4
5
6
7
8
9
10
11
12

What's Your Need

1—All Purpose
2—Pile Driver
3—Water Suction
4—Twin-Weld®
5—Dredge Sleeve
6—Cement Placement
7—Air Drill
8—Sand Suction
9—Steam
10—Water
11—Air
12—Road Builders

When your job calls for hose . . . any type of construction hose . . . always specify Hewitt-Robins Hose. On job after job it has proven the best buy for safe, economical, long-term performance.

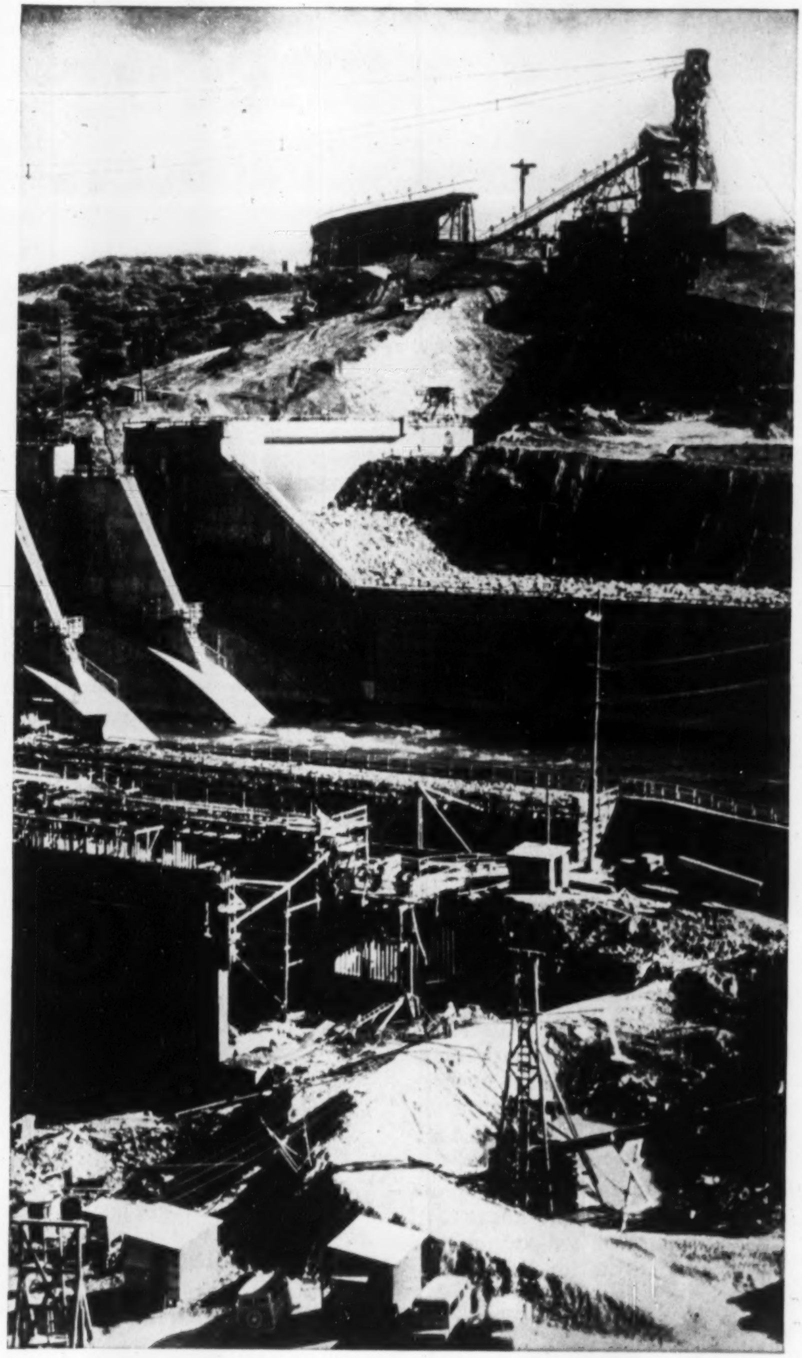
Hewitt-Robins manufactures a complete line of quality hose for the entire construction industry. You'll find there's one to meet your every need.

HR

HEWITT-ROBINS

EXECUTIVE OFFICES, STAMFORD, CONNECTICUT

For Construction Hose?



Here is a partial list of

HEWITT-ROBINS PRODUCTS

that will help you
cut handling costs and
increase operating efficiency.

MACHINERY

- Belt Conveyors
- Belt & Bucket Elevators
- Car Shakeouts
- Conveyor Idlers
- Dewaterizers
- Mechanical Feeders
- Foundry Shakeouts
- Mine Conveyors
- Reclaiming Systems
- Screen Cloth
- Stackers & Trippers
- Vibrating Conveyors & Screens

INDUSTRIAL RUBBER PRODUCTS

BELTING:

- Conveyor
- Elevator
- Transmission

HOSE:

- Acid
- Air & Air Drill
- Barge Loading
- Dust Suction
- Fire
- Fuel Oil & Gasoline
- Gasoline Pump
- Mud Pump Suction
- Oil Suction & Discharge
- Propane-Butane
- Road Builders'
- Rotary Drilling
- Sand Blast
- Sand Suction
- Sea Loading
- Servall®, All-Service
- Steam
- Tank Car & Tank Truck
- Vacuum & Air Brake
- Water & Water Suction
- Welding, Twin-Weld®

•

For information and service on industrial rubber products, contact your Hewitt-Robins Industrial Supply Distributor. Through his complete stock of Hewitt-Robins Rubber products, and his familiarity with local field conditions, he can fill your supply needs promptly and correctly. See Classified Phone Book for the Hewitt-Robins Industrial Supply Distributor serving your area.

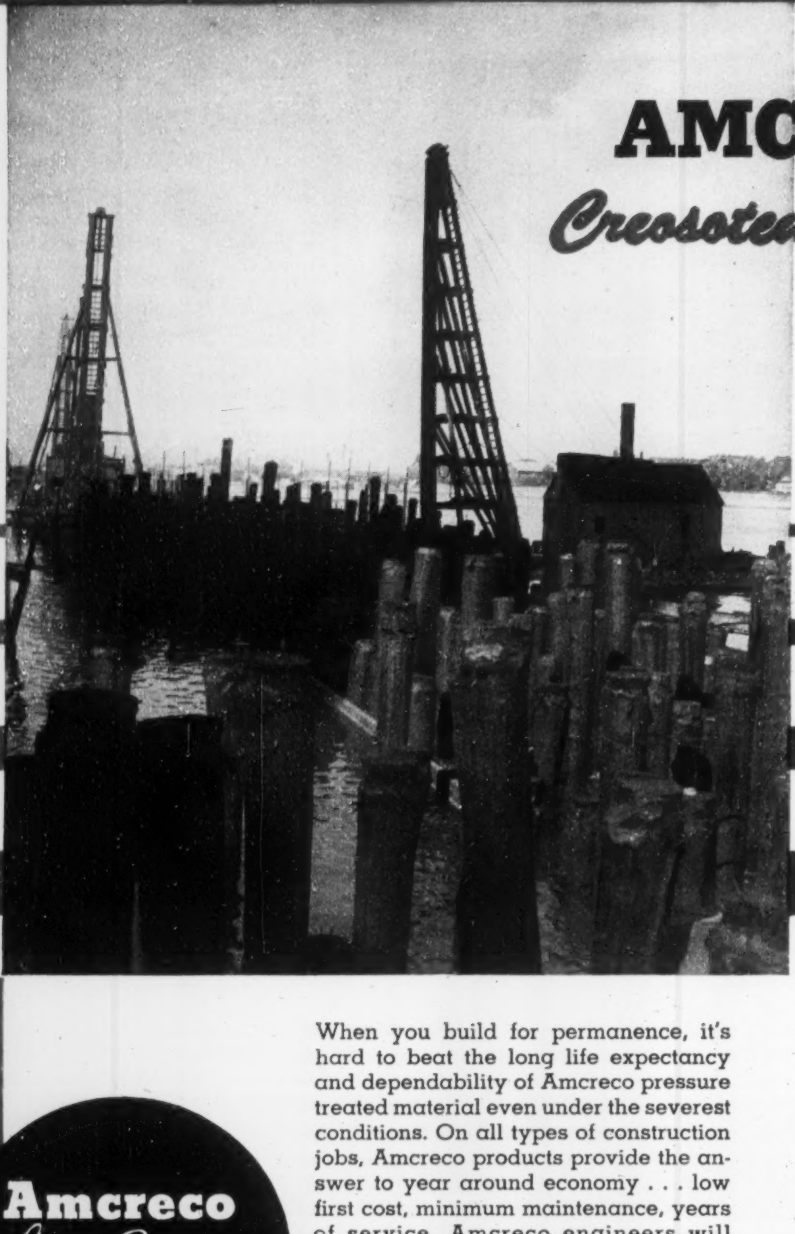
6643

INCORPORATED

DOMESTIC DIVISIONS: Hewitt Rubber • Robins Conveyors • Robins Engineers • Restfoam

FOREIGN SUBSIDIARIES: Hewitt-Robins (Canada) Ltd., Montreal • Hewitt-Robins Internationale, Paris, France • Robins Conveyors (S. A.) Ltd., Johannesburg • **EXPORT DEPARTMENT:** New York City.

THE BASIC STEP FOR SOUND CONSTRUCTION



AMCRECO

Creosoted PRODUCTS

DEPENDABLE SERVICE

LONG LIFE

MAINTENANCE ECONOMY

Amcreco
Lowry Process
Creosoted
Products

When you build for permanence, it's hard to beat the long life expectancy and dependability of Amcreco pressure treated material even under the severest conditions. On all types of construction jobs, Amcreco products provide the answer to year around economy . . . low first cost, minimum maintenance, years of service. Amcreco engineers will gladly help you plan for permanence at low cost . . . write for information.

AMERICAN CREOSOTING COMPANY
INCORPORATED

COLONIAL CREOSOTING COMPANY INCORPORATED
AMCRECO LOWRY PROCESS CREOSOTED WOOD
GEORGIA CREOSOTING COMPANY INCORPORATED

GENERAL SALES OFFICE — CHICAGO, ILLINOIS

PILES
●
POLES
●
FRAMED BRIDGE TIMBERS
●
CROSS ARMS
●
CONDUIT
●
PLANKING
●
ADZED AND BORED CROSS TIES
●
BRIDGE TIES

The solution, which harmonizes with sound fire-protection practice, provides that where distance separations conform to the code, non-combustible panel walls shall not be required to have any fire-resistance rating. But there must be at each floor level a continuous vertical separation, or spandrel, at least 3 ft in height, with a fire-resistance rating of at least 1 hour (except where such walls form a part of an exit required to be enclosed).

EDWARD J. MCGREW, JR.
Chairman
State Building Code Commission
New York, N. Y.

Equation misprinted

SIR: In ENR Jan. 14, p. 54, there appeared an article entitled "Moment of inertia computations simplified for irregular sections". Unfortunately, a misprint occurred in the basic formula of that article: a plus sign was substituted for a multiplication sign. The correct formula should read:

$$I = I_L + I_S + \frac{A_L e^2}{c}$$

HAROLD G. LORSCH
Assistant Professor
The City College
New York, N. Y.

CALENDAR

National Crushed Stone Association, Conrad Hilton Hotel, Chicago, Feb. 22-24.

Highway Engineering Conference, University of Colorado, Boulder, Feb. 25-26.

American Concrete Institute, Golden Anniversary Convention, Shirley-Savoy Hotel, Denver, Colo., Feb. 22-25.

American Concrete Pipe Association, annual convention, Fairmont Hotel, San Francisco, Calif., Feb. 25-27.

Associated General Contractors of America, Hotel Statler, Los Angeles, Calif., March 1-4.

Illinois Highway Engineering Conference, University of Illinois, Urbana, March 2-4.

N. Y. State Association of Highway Engineers, Arlington Hotel, Binghamton, N. Y., March 3-5.

Association of Highway Officials of the North Atlantic States, Hotel Shoreham, Washington, D. C., March 10-12.

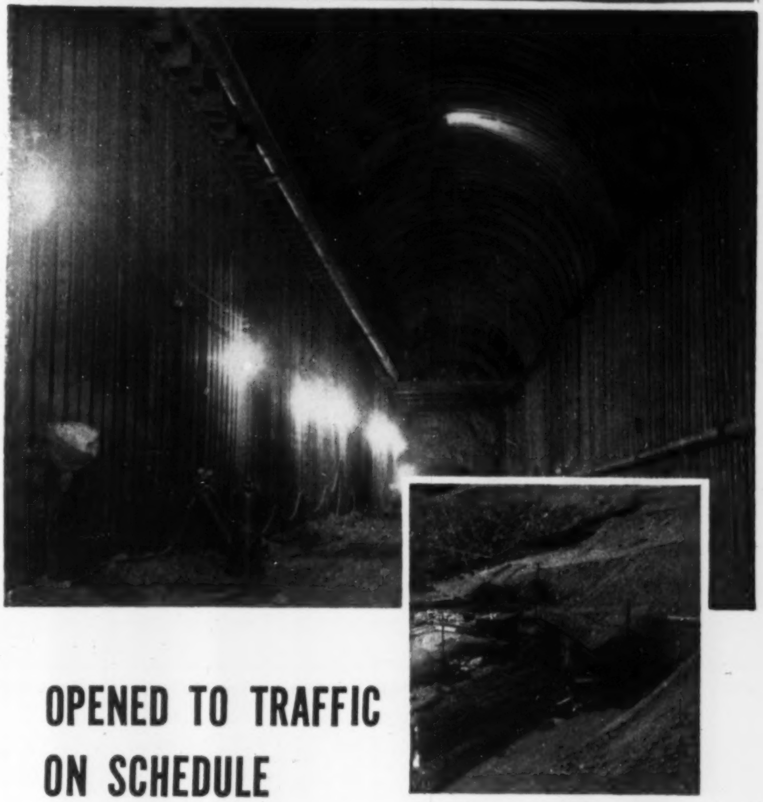
American Railway Engineering Association, Palmer House, Chicago, March 16-18.

Southern Municipal and Industrial Wastes Conference, N. C., State College, Raleigh, N. C., March 18-19.

American Congress on Surveying and Mapping, annual meeting and exhibit, Hotel Shoreham, Washington, D. C., March 22-24.

Southeastern section AWWA, Poinsett Hotel, Greenville, S. C., March 29-31.

Erection Time Is Cut With "COMMERCIAL" Steel Tunnel Supports



OPENED TO TRAFFIC ON SCHEDULE

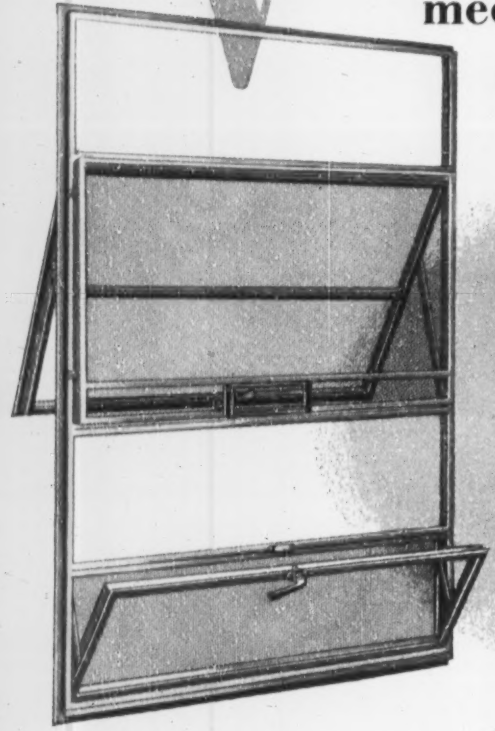
You can see how close to the heading these "COMMERCIAL" steel tunnel supports are set into place. Because they are accurately and completely fabricated they are placed at the design line and quickly bolted into a lining which can add structural strength to the permanent lining. Steel supports have smaller cross section than timber sets and can be incorporated in the concrete lined area. Substantial savings in tunnel excavation and concrete lining will result when steel tunnel supports are installed. "COMMERCIAL" prefabricated steel tunnel supports offer many other advantages which will assist you in realizing substantial savings and accelerated progress reports. Transition to steel supports before your heading is started is much less costly.

INADEQUATE SUPPORTS MAY...
STOP YOUR TUNNEL JOB.

THE COMMERCIAL SHEARING AND STAMPING COMPANY
YOUNGSTOWN, OHIO • CHICAGO, ILL. • SALT LAKE CITY, UTAH

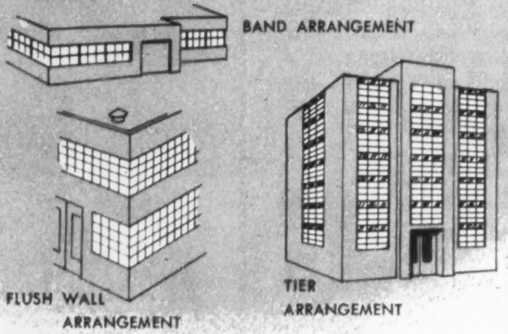
Visioneering*

meets the demands of modern building trends

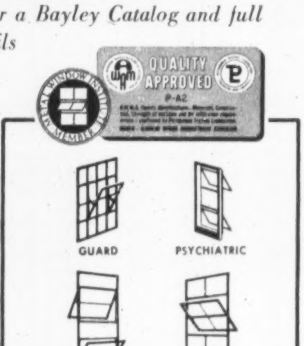


BAYLEY

aluminum projected windows in panel wall arrangements



As a result of Bayley Visioneering you can now execute many of your choice design treatments in modern panel-wall construction, without the costliness of special window designing. With Bayley subframe design, which accommodates separate window units, standard Bayley Aluminum Projected Windows (with channel frames) of any standard size can be used—offering wide flexibility in the use of newer panel decorating materials, plus the desired window area for providing maximum air, light and vision. Window units are available in a variety of ventilator arrangements. And in addition to the many other advantages of the projected type window, the maintenance-free aluminum construction complements all types of building materials. If you're not fully acquainted with this newest Bayley development look up Bayley's Aluminum Window Catalog in Sweet's—or better yet, *write for a Bayley Catalog and full size drafting room details*



*V*isioneering—The science of coordinating vision, air and light in modern building walls with windows of advanced design.*

Bayley Visioneering* Reflects 75 Years of Reliability

*Copyright 1953 The William Bayley Company

THE WILLIAM BAYLEY COMPANY

Springfield, Ohio

District Offices:

Springfield Chicago 2 New York 17 Washington 16

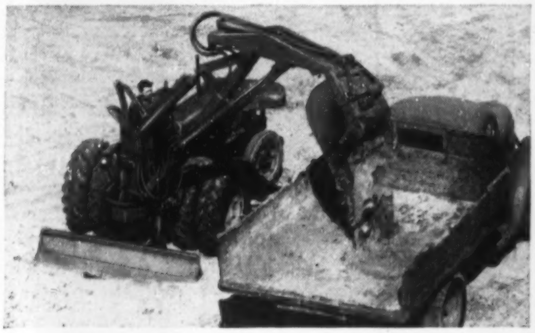
NEW OLIVER 88WT Hydro-Trencher

Digs to 10 feet in toughest going!

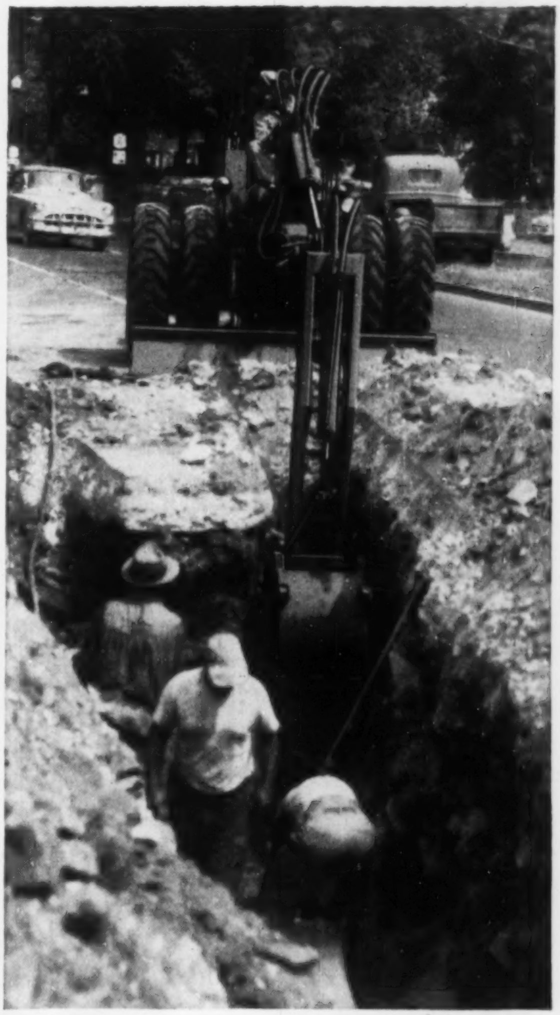
Here is a trencher that won't stop when it comes to rocks or roots. Tremendous hydraulic down pressure forces the half-yard bucket into the ground for a fast, full load. New dual-circuit control gives constant pressure, more positive control and greater flexibility in any kind of going.

Take a close look at this new trencher. It reaches long and digs deep. Its simple, sturdy construction and all-hydraulic operation give low maintenance and long service. The hydraulic stabilizer blade not only holds the tractor level and steady, but is an excellent back-filler blade. And, by simply turning the trencher bucket around you have an efficient swing loader.

Test the new Oliver 88WT Hydro-Trencher on your work. See how easy it is to operate and how readily it digs or loads the toughest material. And remember, the 88WT is ready to work or move instantly, and takes only one man to operate. Get in touch with your Oliver Industrial Distributor for a demonstration, soon!



It's a swing loader, too! Remove the bucket hinge pin and turn the bucket around. In minutes the trencher becomes a loader. No extra parts are needed. The exceptional bucket rotation permits loading into a truck up to 10 feet, 6 inches. Optional loading bucket loads up to 12 feet.



Right through the roadbed! Powerful hydraulic down pressure digs through this material with ease. Positive dual-circuit control gives a choice of *three* separate lift or drop speeds on the boom for any condition. Bucket rotation and dipper stick design permit clamping rocks larger than the bucket itself. Special boom cylinder available for digging to 12 feet.

One-half yard bucket! The fast hydraulic operation and big bucket capacity of the 88WT let you do more in less time. All-hydraulic operation means, too, that there are no expensive cables or clutches to replace. Maintenance is simple and low cost.

THE OLIVER CORPORATION

400 West Madison Street, Chicago 6, Illinois

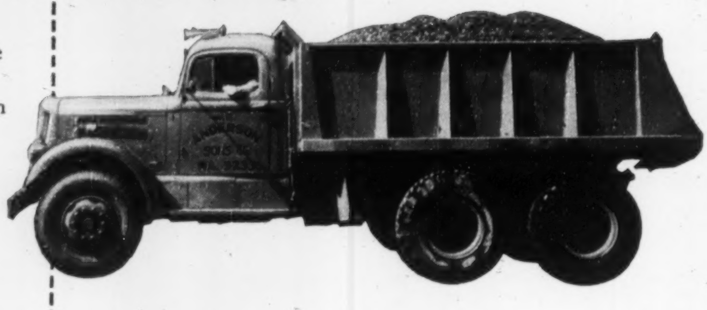
Rugged White "Ten-Wheelers"...

ON THE JOB day after day, they keep ready-mixed concrete on the move for W. E. Anderson Sons Co., Columbus, Ohio. These tandem-axle Whites with 4½-yard mixers have the stamina and durability to keep on tight schedules with the very minimum of downtime. The extra power of the Whites pays off first day in service and for more years!

W.E. ANDERSON
MA. 3
COL. O.
77

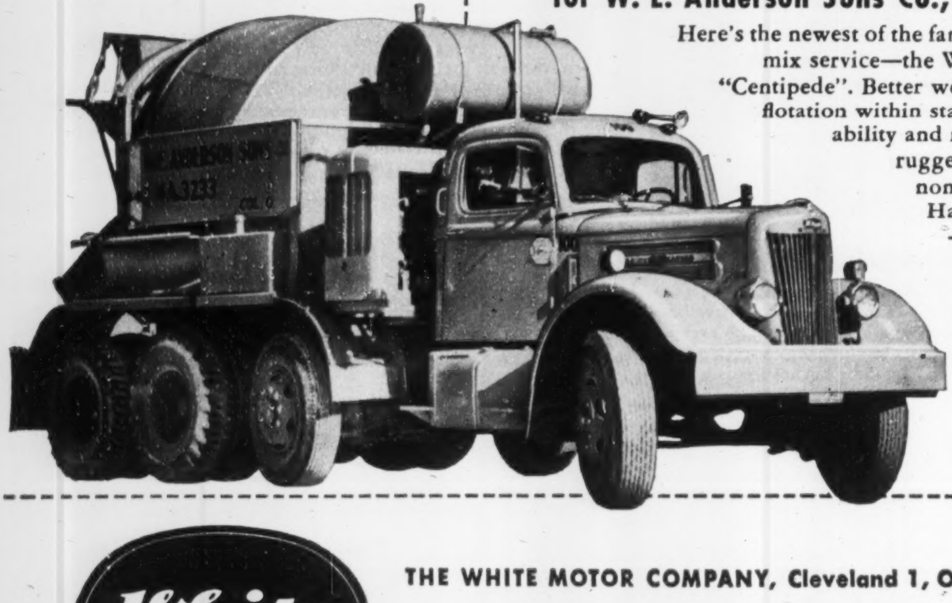
Sturdy White Tandem Dumps...

It's the same quality story in aggregate delivery and stock piling by W. E. ANDERSON SONS CO. White tandem axle dumpers with nine yard capacity. Plenty of White Mustang Power for the big loads and every unit sturdy and dependable without sacrificing payload.



AND NOW THE NEW "CENTIPEDE"

for W. E. Anderson Sons Co., Columbus, Ohio



Here's the newest of the famous Whites in ready-mix service—the White Steering Pusher "Centipede". Better weight distribution and flotation within state limits... maneuverability and road stability even on rugged terrain... and economical Mustang power! Handles 6-yard mixer —24,000 lbs. payload and 100 gallons of water within state limits.

Get facts about this great line of Whites for *your* business. See *your* White Representative!

White

THE WHITE MOTOR COMPANY, Cleveland 1, Ohio

FOR MORE THAN 50 YEARS THE GREATEST NAME IN TRUCKS

WICKWIRE ROPE
A CF&I PRODUCT

Our house? Built with wire rope?

Not only yours, Mr. Brown, but millions of others too.

A miracle of the postwar years has been the construction of more than 7-million new dwelling units. Accomplishment of this tremendous task has called for "muscles of steel"—rugged wire rope that is a vital factor in mining the ore, quarrying the stone and bringing out the timber that comprise the basic components of every house and building—large or small.

Supplying these "muscles of steel" to the giant that is American industry is our big job here at Wickwire—a job we've been doing well for over half a century.

In the mines . . . the quarries . . . the logging camps—and wherever wire rope is used, they'll tell you that for utmost safety, longer life and most economical service you can always count on the quality and strength that is built into Wickwire Rope.

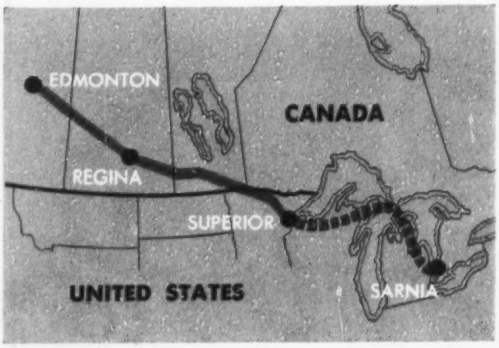
A YELLOW TRIANGLE ON THE REEL IDENTIFIES WICKWIRE ROPE

THE COLORADO FUEL AND IRON CORPORATION—Abilene (Tex.) • Denver
Houston • Odessa (Tex.) • Phoenix • Salt Lake City • Tulsa
PACIFIC COAST DIVISION—Los Angeles • Oakland
Portland • San Francisco • Seattle • Spokane
WICKWIRE SPENCER STEEL DIVISION—Boston • Buffalo • Chattanooga
Chicago • Detroit • Emlenton (Pa.) • New Orleans • New York • Philadelphia

WICKWIRE ROPE
CFI PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

1873

Spanning half the North American continent, Canada's Interprovincial Pipe Line and its American subsidiary, Lakehead Pipe Line, recently completed its extension from Superior, Wisc., to form the world's longest crude oil pipe line—1765 miles from Alberta's rich new oil fields to Eastern Ontario refineries.


EDMONTON
CANADA
REGINA
SUPERIOR
UNITED STATES
SARNIA

30-inch Lakehead Pipe Line moves through upper Michigan swamplands, where welders needed platforms to keep from sinking in muck. On this 100-mile section, Midwestern Constructors used a battery of Lincoln portable welding machines, each powered by a two-cylinder GM Diesel engine.

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Straits crossing was handled by Merritt-Chapman and Scott, New York, with Midwestern Constructors, Tulsa, as subcontractors. Midwestern also laid sections of the line above the Straits and handled the St. Clair River crossing as prime contractors.

Crossing the Straits—GM Diesel-powered tugs keep Merritt-Chapman's cable-laying barge on course by running guide lines to buoys for one of the longest and deepest underwater crossings in pipe line history.

Shooting a "pig"—Tight-fitting disc, called a "pig," is shot through welded pipe to remove dirt. Air blast is delivered at steady pressure of 100 psi and better by GM Diesel-powered Ingersoll-Rand compressor supplying up to 600 cubic feet of air per minute.

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Lining up pipe—GM Diesel-powered Allis-Chalmers tractors line up 2500-ft. welded pipe sections. They also moved pipe and welding machines and handled many utility jobs. Work gets done faster with smoother-running GM 2-cycle Diesels in your equipment line up.

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conveyor belt carrying crushed limestone rock from primary crusher to the vibrating screens.

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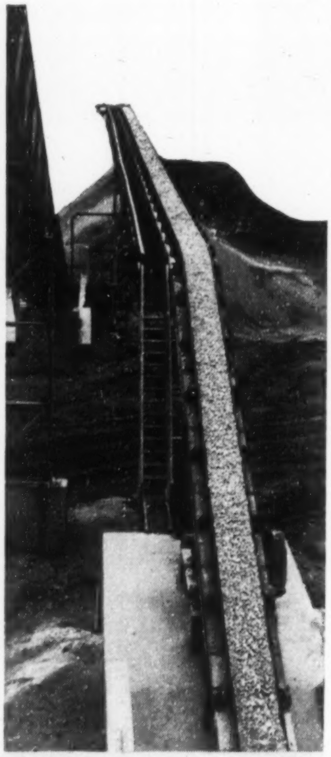
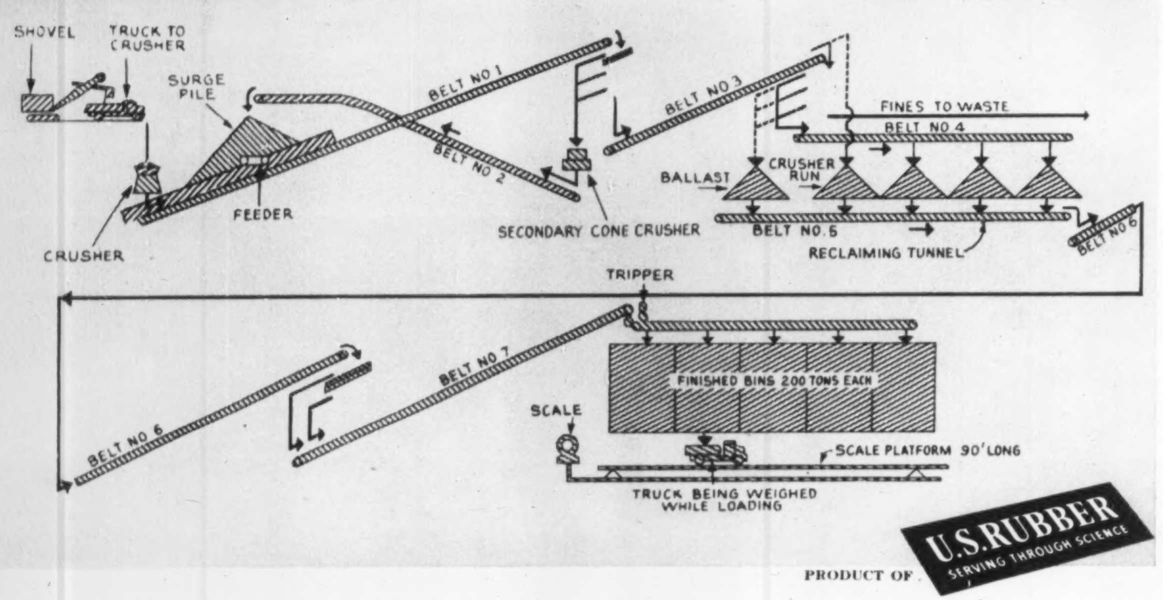
conveyor belt carrying secondary crushed oversized material to surge pile.



Flow of materials through the crushed stone plant.


SHOVEL
TRUCK TO CRUSHER
SURGE PILE
BELT NO 1
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BELT NO 3
FINES TO WASTE
BELT NO 4
BALLAST
CRUSHER RUN
FEEDER
CRUSHER
SECONDARY CONE CRUSHER
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FEBRUARY 18, 1954

Vol. 152, No. 7

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THE CONSTRUCTION WEEK

COURT EASES TAXES—Contractors can make money by studying the last week's U. S. Supreme Court decision that knocked out Arkansas' tax claims on a contractor who bought equipment for use on a government contract.

Legal experts see the high court's action as striking down similar tax laws in Washington, Ohio and Indiana, calling for refund of taxes collected from contractors in those states before Oct. 1, 1953.

Crux of the Arkansas matter was this: Two contractors working under cost-plus federal contracts on a Navy depot near Shumaker, Ark., bought equipment from a local dealer. Contractors protested that they were acting as agents of the government, so shouldn't pay the state tax. State courts held they bought the equipment (two tractors) for use by themselves, not by the government.

WHO'S POLLUTED?—Maine citizens are working themselves into a fine lather over how fast and how far to go on stream pollution clearing.

While a stream improvement committee of the Associated Industries of Maine was announcing it would go slowly and carefully, gathering information and recommending gradual steps, a group known as Citizens for Conservation and Pollution Control (led by an Auburn veterinarian) charged state agencies are captives of the industries, and both industries and state are blocking improvements.

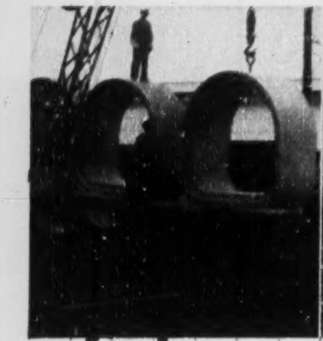
NO OUT FOR WASTE PLANT TAXES—Don't look for passage of the Bailey Bill (HR 7170) for rapid tax writeoff for construction of industrial waste plants, this session.

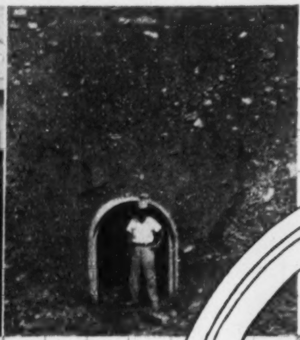
The House Ways and Means Committee has a number of similar bills before it: Industrial waste and smoke control seem to be favorite subjects advanced for fast writeoff.

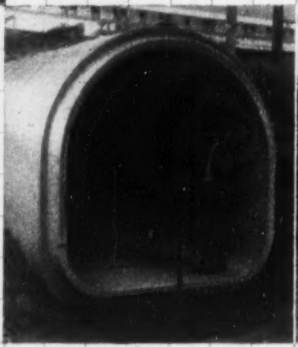
But it seems certain that the committee won't go much beyond the stepped-up depreciation writeoff that it has already approved (two-thirds of the cost of an industrial facility in one-half its useful life).

DAM TROUBLES—The Northwest was finding plenty of trouble in a number of schemes for dam construction:

Montana's state forester figured it will cost $18.8 million to relocate highways and rail lines if the U. S. builds Libby Dam at the recommended location—and besides, the reservoir would be a barrier to transport of logs and cordwood. . . . The state of Washington will have a $23,615 bill to pay on a highway bridge over the Snake River, as result of damages when logs were released through Washington Water Power Company's Lewiston, Idaho, dam.







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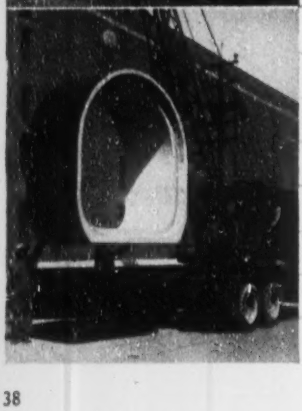

WASHINGTON OBSERVER

Construction fares as well under Republicans as under Democrats—Any review of the first year of the Eisenhower regime and of the outlook for the coming year brings you squarely to that conclusion. All across the board—from housing and credit to highways, flood control, and military bases—the construction industry has learned that it rates high at the Republican White House and in Congress.

Political jockeying by both Republicans and Democrats—to avoid being tagged in the public mind as responsible for any recession—helps to keep public works and other construction programs constantly in the minds of top politicos of both parties.

•

Hearings of the Joint Economic Committee spotlighted construction problems that need action from the Administration (see page 44). All are agreed that programs should be made ready and on the shelf for the day when they may be needed. But there were warnings that the shelf of blueprints becomes obsolete as needs change. There's no substitute for a steady flow stream of funds to support the engineering and planning studies that must be done by state and city governments.

Housing rates high as a prop to the economy and a potential of great importance in offsetting any economic slide. Specifically the Administration figures to offset any drop in housing starts with a big boost in modernization and home improvement. There are billions of dollars worth of business that could be tapped here, the housing officials believe, and they're anxious to work up a program that would make it easier for the homeowner to buy.

Military bases and military construction generally will be kept high. The new strategic policy fixed by Eisenhower favors more airpower and that means more bases and other facilities to house and service the expanded air wings.

•

Politics has pushed new starts in flood control and power projects. Even before recession talk blossomed, the Administration had known that political realities required that the West, particularly, be given good reason for confidence that it would not suffer under the Republicans on this score.

Also, the St. Lawrence fight is an example of political chain reaction. The sudden progress of the Seaway legislation in Congress has been publicized as a bright example of the results obtained from bringing Eisenhower's personal prestige into play. But there's another side to the story—and that is that political deals were made to swing long-time opponents of the Seaway over to the other side:

Colorado Senators Millikin and Johnson got backing for the Echo Park storage project for the upper Colorado River—something they might not have been able to push through otherwise.

New England senators who had sided with port interests in their area came over to vote for St. Lawrence in return for the Administration's approval of a $3-million study to take a fresh look at the old Passamaquoddy power project in Maine. And there's talk that some Southerners got assurances that certain needs along the lower Mississippi River would be backed by the Administration when the time comes to bring them forward.

•

Huge output of farm crops means more demand for storage buildings—perhaps as much as $50 million to $75 million worth or more before the year is over. This year's farm production is covered by the present law guaranteeing 90% of parity prices for big grain crops—and controls haven't yet held down production. The result is that space for at least 250,000,000 bu of grain must be found. The government isn't building the storage, but does have programs to help finance construction of commercial elevators, and to help farmers build or buy their own bins for on-farm storage. One hitch: Administration's program to "cut down the farm surpluses" makes elevator men think expansion is risky, despite government aid of contracts for much of the storage space.

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Federal construction plans loom larger

Congressional attitudes indicate probable loosening of purse strings for new projects and aid programs

Washington Staff Report

The Eisenhower Administration—in Congress and in the departments—is raising federal outlays for construction in the year ahead.

Gone is the austere "no new starts" policy of last year and in its place is a rather substantial loosening of the purse strings. The previously announced 23 new starts are only a beginning—and not too big a one—but they signal that with the cost of defense falling, the Administration is willing to look favorably on more development. Overall, it adds up to a pretty big package.

- There will be random new starts on power and reclamation projects.
- There very likely will be authorization for the $1-billion upper Colorado water shortage project.
- There will be the first Omnibus Rivers and Harbors and Flood Control Bill since 1950, with slightly over $1 billion in new work authorizations before Congress.
- The biennial Highway Authorization Bill calls for increasing federal highway aid by 50%.
- There may even be more money for public housing starts.
- And more significantly, the Administration is poised to spend even more if a downturn in business gets more serious.

About the only field where austerity continues is in the field of all-federal electric power spending.

• Power

• Hell's Canyon—There won't even be a serious effort in Congress to put through any part of the controversial Hell's Canyon project on the Snake River in Idaho. But there is a very good chance that before the year is out the Federal Power Commission will act—perhaps favorably—on the request of the Idaho Power Co., for a license to build low dams near the proposed Hell's Canyon site. If the license is granted, the Hell's Canyon advocates are sure to tie the case up in the courts for a long time.

• Private power—The new Administration is not likely to reconsider its sharp reversal of New Deal power policies in other areas. Actually, most congressional Republicans would like to add to advances made last year in cutting off federal power funds and turning over as much power construction as possible to private power. Democrats are anxious for a chance to debate the power issue, which they consider gives them one of their sharpest campaign issues this fall.

• Niagara—That is why so much depends on the Niagara Power Development Bill, now in the Senate. It would turn over construction and operation to five New York utilities. This bill, sponsored by Senator Capehart and Senator Martin in the Senate is in conflict with three bills calling for public development of the project, sponsored by Senators Case, Lehman, and Ives. A companion bill to the Capehart-Martin Bill (the Miller Bill), has passed the House by a two-to-one margin. A major fight is developing with a public vs. private outcome at stake.

• TVA cutback—TVA is due to get rough treatment at the hands of Congress this year. No money will be permitted for new starts. And the Fulton steam plant has been turned down by the committee, despite an appeal from Gov. Frank Clement of Tennessee who told Congress that the area is threatened with a "brownout." An effort will be made in the House and Senate to vote money for the Fulton steam plant—the outcome to be a second major influence on future power policy.

There is very strong feeling in the House Appropriations Committee to cut back on TVA's operation. One committee member, Rep. Charles R. Jonas, is urging the TVA be cut loose from federal appropriations and be put on its own with the responsibility of going out into the money market to get funds to finance its operations. Jonas says that while TVA sold its power for $227 million last year, it was allowed to spend all of that and got an additional $188 million from Congress. He pointed out that last year the authority paid back only $15 million to the federal government on the $1 billion it has received for power development.

• Federal-local partnership—Perhaps the greatest progress that will be made this year in the new approach on power will be in the field of federal-local government partnership on waterways development.

Three such bills now are before Congress and prospects are good for favorable action. Just last week Sen. Guy Cordon introduced a bill to be known as the Cougar project in Oregon in which the city of Eugene would pay for the construction of power facilities and the federal government would finance the cost of flood control features.

The same approach would apply on two other pending legislative proposals: The Markham Ferry project in Oklahoma, already passed by the House, and the Priest Rapids project in Washington state. In the Priest Rapids project local public power entities would finance the power features while the federal government, as in the others, would finance the nonreimbursable features.

• Passamaquoddy—Another possible development in the power field is a study of the oft-proposed Passamaquoddy power project in the Bay of Fundy between the United States and Canada. The Senate already has authorized an expenditure of $3 million by the International Joint Commission for looking into feasibility of developing power for the northeastern section of the U. S. and adjacent Canada by harnessing the tides in the Bay of Fundy.

The bill, now pending before the House, would call for a two-year study. If authorized, and Congress appropriates the money, the commission consisting of three Americans and three Canadians will report to both governments on the proposed project.

Under the 1909 treaty setting up the commission, studies can be requested by either government. The Canadian government, as such, has no active role in the proposed study.

• Housing

• Federal support—Congress and the Administration have laid the groundwork for helpful housing action at this session. Banking Committee chairmen of both houses last week introduced identical bills that would carry out the President's recommendations for broadened and liberalized federal support of home building activities.

There isn't much in the bill to cause a bitter fight. Controversial issues like the Federal National Mortgage Assn., and housing for low-income families are so handled as to soften die-hard opposition.

Enactment of legislation along the general lines proposed seems assured. If the bill could become law before May, it would stimulate house construction during the 1954 building season. Even if final passage should be delayed, the favorable prospects for enactment will encourage builders to get ready for good future business.

This is what the bill would do to carry out the main points of the agreed-upon housing program:

- Increase FHA mortgage ceilings, maturities and loan-to-value ratios—not arbitrarily, but at the discretion of the President;
- Make interest rates flexible for FHA an VA loans, letting the President adjust them up to 2½% above the current yield on long-term government bonds;
- Give equal terms to older houses;
- Liberalize repair and improvement loans—for example, raising the limits to $3,000 and five-year repayment for single-family homes; also, permit FHA to insure loans under open-end mortgages;
- Authorize an additional total of $2 billion of FHA-insured loans to permit that agency to maintain its 1953 level of activity;
- Recreate Fanny Mae as a government corporation eventually to be owned, but not managed, by private lenders who sell mortgages to it; the new Fanny Mae would continue to give advance commitments under the one-for-one program, and it could borrow up to $1 billion from the Treasury to support special housing programs such as those proposed for low-cost housing in urban renewal areas;
- Allow 100% FHA insurance of mortgages up to $7,000 for new or rebuilt homes, with 40-year maturities and $200 down payments, available to displaced families in urban renewal areas;
- Set up special FHA loan insurance terms for construction or rehabilitation of other housing in designated renewal areas;
- Authorize $5 million for 50% grants to assist regional and small-city planning and $10 million for interest-free loans to finance advance plans of local public works.

Congressional scoreboard

Here is a report on major construction legislation now before Congress. This ENR service, charting the course of these and other measures yet to be introduced, will be published periodically. Status of the bills is traced by the following symbols: H—House of Representatives; S—Senate; i—introduced; c—in committee; r—reported on the floor; p—passed.

St. Lawrence Seaway	Hc
Niagara power project	Hp Sc
Omnibus rivers & Harbors & flood control authorization	Hc
Omnibus Housing (FHA, FNMA, public housing, etc.)	Hi Si
MacGregor highway aid	Hi
Case highway aid	Sc
Judicial review of contract disputes (Wunderlich case)	Sp
Bid shopping	Sr
Lease-purchase of public buildings	Sr
Upper Colorado Basin development	Hc
Santa Maria project	Hp
Reclamation projects over $5 million (to be made subject of Congressional approval)	Hp

• Highways

• Aid to increase 50%—Another construction field in which the Administration is ready to loosen the purse strings is federal aid to highways. An Administration bill already is before the House Public Works Committee calling for $864.5 million a year each for 1956 and 1957. This is a 50% increase over the current bill, which provides $575 million through fiscal 1955.

A radical Administration innovation in handling federal aid calls for making $200 million, earmarked for interstate and defense highways, contingent on Congress keeping the 2 cents a gallon tax on gasoline. Opposition already has been voiced by congressmen on the Public Works Committee in objecting to tying their bill to action of another committee, or in effect, using it as a lever to force the other committee to keep the present excise rates on gasoline.

The President, in sending up the increased aid bill, pointed out that federal revenue from the gasoline tax at present rate is $910 million a year.

• Military and civil works

• Updating rivers — The Omnibus Rivers and Harbors and Flood Control Bill before the House Public Works Committee is the first such omnibus bill since 1950. Something like $1 billion in new authorizations are before the committee for study. It may not be necessary for the committee to ask for $1 billion in new authorization, however, even if it should approve all pending projects. Some committee members would like to reappraise the backlog of approved projects, some of which date back to the mid-thirties. That would amount to de-authorizing outmoded or no longer feasible projects and making this money available for new projects.

• $1.5 billion for military—On military construction, the House Armed Services Committee expects to have an authorization bill to go to work on early in March calling for well over $1.5 billion in new military construction.

The Air Force would get the major part of it, $1 billion for domestic bases and $500 million for overseas bases.

As for appropriations, the Air Force is expected to get 90% of the $1.1 billion in the new funds that will be asked. Recent announcement of 13 new airbase projects underlines emphasis being given airpower under the new defense concept. The switch to putting the emphasis on airpower will mean increased money for construction.

Locations of the airbases named for first phase of Air Force 1955 build-up program are:

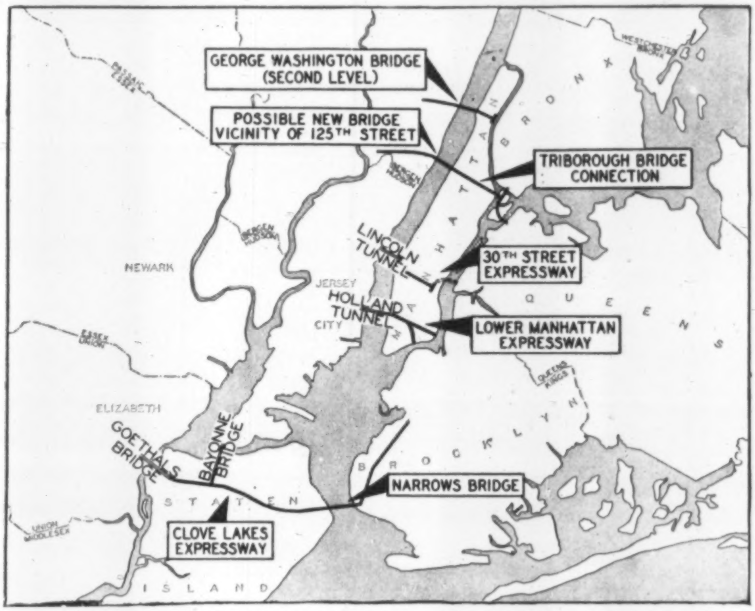
Fargo, N. D., area; Glasgow, Mont., area; Klamath Falls, Oreg., area; Traverse City, Mich., area; San Diego, Calif., area; Bismarck, N. D.; Blytheville, Ark., Clinton, Okla. (Clinton-Sherman Airport); Columbus, Miss.; Marquette, Wis. (I. I. Sawyer Field); Mission, Tex. (Moore Field); Myrtle Beach, S. C., and Goldsboro, N. C.

• Anti-recession measure

• Government alert—The Administration is alert to the potential value of public works for counteracting a downturn in general construction. Federal agencies already are under orders to keep their construction programs and plans in the best possible shape for swift translation into active projects, if needed.

Eisenhower's economic advisers say the money outlay for federal public works could be stepped up by 50% or more in one year, if necessary. For state and local public works, they think a similarly rapid expansion would be possible, provided financing is adequate.

• $10 million for planning—Some effort is being made to stimulate local preparations for such a possibility. Congress is being asked to appropriate $10 million to revive the defunct program of interest-free loans to state and local governments for advance planning of public works. And another reserve of potential projects is beginning to appear as a result of Administration offers to join as a partner in local development of natural resources, principally water and power.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QUEENS KINGS

EXTENSIVE BUILDING PROJECTS, labeled on map, are being surveyed to determine priority of construction to help solve New York City's traffic congestion.

New York plots traffic improvements

Two agencies join to survey bridge, expressway, parking facilities to ease city's arterial traffic congestion

New York's Port Authority last week followed up its announcement of an extensive construction program (ENR Jan. 28, 1954, p. 128) by inaugurating a study of all major phases of the arterial traffic problem in the New York-New Jersey metropolitan area. The survey is being carried out jointly with the Triborough Bridge and Tunnel Authority of New York City.

Construction studies scheduled for completion this fall, include the following:

• **The Narrows Bridge**—A high-level bridge connecting Brooklyn and Staten Island over the main channel used by ships entering or leaving New York Harbor.

This structure would facilitate development of the almost-rural Borough of Richmond (Staten Island), and provide a by-pass route south of Manhattan for New Jersey-Long Island traffic, and for through traffic moving between the South, West and New England.

• **Lower-level bridge**—Provision of six new lanes for vehicular traffic on the George Washington Bridge combined with new and expanded approaches on both sides of the Hudson and over the Harlem River would accommodate an increasing proportion of traffic between New Jersey and Manhattan.

Originally designed for a second level for elevated trains below the existing roadway, this project will be studied primarily from the standpoint of the difficult problem of approaches and connections.

• **New bridge at West 125th St.**—This facility over the Hudson River would provide, by direct connection with the Triborough Bridge, a through artery between Long Island, with its essential airports, and New Jersey, with no intermingling of city and through traffic en route.

• **Crosstown expressways**—A review of the need for trans-Manhattan vehicular facilities (Lower Manhattan Crosstown Expressway and the 30th St. Expressway) will be made for local traffic in the light of possible new by-pass routes across The Narrows and upper Manhattan for through traffic between New Jersey and Long Island.

A study also will be made of the physical and economic practicability of a 30th St. crosstown tunnel as an alternate to an elevated expressway.

• **Parking facilities**—As an integral part of the joint studies, all will include recommendations as to the possibility of off-street parking facilities either beneath the elevated expressways or on independent sites adjacent to the expressways.

The study also will include an exploration of possible peripheral parking facilities in the outlying areas of New York City and in New Jersey to provide traffic relief during peak hours.

• **First joint venture**—Bayard F. Pope, acting chairman of PNYA, and Robert Moses, chairman of TBTA, said that the unprecedented combined effort of both authorities is needed to find "an overall solution to the problem of destructive traffic congestion in the bi-state metropolitan area."

Pope emphasized the need for additional facilities with an illustration of traffic-volume growth. Only a few years ago, he said, it was estimated that by 1960 some 69,000,000 vehicles yearly would pour into, out of and through New York City. But, last year—seven years short of 1960—more than 73,500,000 vehicles used the existing metropolitan facilities, and the 1960 estimate is now placed at 95,000,000 vehicles.

GEORGE WASHINGTON BRIDGE, completed in 1931 without the lower level it was designed to include, may now get this addition to handle more highway traffic.

ENR photos by Compton

Joint Congressional Committee on the Economic Report is warned that . . .

Public works pump priming wouldn't be easy

Photo by Tames

ECONOMIST: Walter E. Hoadley, Armstrong Cork Co.

—New housing horizons

"The outlook is for the rate of new homebuilding to rise by the middle 1960s to 1.5 to 2 million units annually. . . . A tremendous opportunity now exists for private initiative to maintain a high and healthy level of total residential construction by combining with expanding work in the 'fix-up' field. . . . Reducing the bottlenecks to financing 'fix-up' projects looms as a major task in the months ahead. . . . What will be required is general adoption of the 'open-end' or 'add on' mortgage principle."

CITY MANAGER: Clarence Elliott, Kalamazoo, Mich.

—Cities need help

"If cities are to keep up present levels of construction they will need federal help. . . . If conditions are not too serious, interest-free or low-rate credit would maintain the present rate . . . if serious, they will need outright grants. . . . We must rearrange our tax sources or see cities surrender their functions. . . . In a downturn it is difficult to increase tax rates. . . . Property taxes are about as high as they can go. . . . We should establish a bureau of local government affairs to co-ordinate relations between local, state and federal governments."

Representatives of business and state and municipal government had an opportunity last week in Washington to assess the construction outlook as stated in the President's recent Economic Report.

Participating in panel discussions conducted by the Joint Congressional Committee on the Economic Report, they tended to share the Administration's confidence that demand for construction work should continue at a high level this year (ENR Feb. 4, p. 21).

But, they did not share the Administration's optimism about the use of standby public works projects as an anti-recession measure. The consensus was that the Administration position overlooks a number of realities—that local governments are not well prepared to participate in this type of pump priming.

Panel members felt that the Administration was too hopeful about translating these needs into actual contracts for construction, particularly as an anti-recession factor.

• Moses urges planning grant— New York City Construction Co-ordinator, Robert Moses—scheduled to be one of the panelists—was absent. But he submitted a statement which put the case for the skeptics. "There is not a state, city, or municipal subdivision in the country which can, on its own, finance a depression construction program sufficient to make a real dent in the employment problem," he warned. About the President's listing of public works needs in the Economic Report, Moses said: "These studies seem to me to be on the over optimistic side."

"I suggest," wrote Moses, "an appropriation of $25 million for grants to localities to review and bring up to date the existing backlog of state and local advance plans."

- **Local financing dubious**–George W. Mitchell, vice-president of the Federal Reserve Bank of Chicago, pointed out that the timing characteristics of public works spending all but render this device unsuitable as an anti-recessionary tool "except in severe and prolonged depressions."

Roger A. Freeman, special assistant to the governor of the state of Washington, recalled that the President's economic report described the backlog of desirable public works as "in the tens of billions." But the practical test, Freeman said, was the willingness of people to pay for such projects at the state and local level.

Clarence Elliott, City Manager of Kalamazoo, Mich., was even more explicit in his warning. He told the committee that cities could maintain their increase in spending for public works another year, but beyond that, would need additional sources of revenue. In case of a broad business downturn, he suggested that the federal government supply interest-free money, or money at low interest rates, to cities, perhaps at a rate of $100 per capita.

- **Housing: Optimism justified**–Panel speakers went along with the President in anticipating a continued high rate of housing starts. Walter E. Hoadley, Jr., economist for Armstrong Cork, thought housing would continue at about the 1953 level. Gordon B. Hattersley, vice-president of Sears, Roebuck, joined Hoadley in stressing the importance of modernization.

- **Industrial: High but with soft spots** –On business construction, the experts were optimistic, on account of current investment plans, but pointed out that a small decline already was indicated and might grow if current soft spots in business continue. Dexter M. Keezer, director of the Department of Economics of the McGraw-Hill Publishing Co., summed up:

- Surveys indicate that for the first quarter of 1954, business is planning to spend more for new plant and equipment than in any first quarter on record.
- For the balance of the year, present plans call for a very righ rate, but one that would fall about $1 billion or $1.5 billion short of 1953's record-breaking $27.8 billion.

STATE AIDE: Roger Freeman, special assistant to Governor of Washington.

BANKER: George W. Mitchell, vice-president, Federal Reserve, Chicago.

MAYOR: Michael Micich, Charles City, Iowa.

—Need federal boost

"It does not seem likely that more than about one-third of the planned drop in federal expenditures can be offset by increased state and local spending in the next two years. . . . States and local governments are very unlikely to boost their public works program at a drastic rate unless stimulated by a vast expansion of the federal grants-in-aid system. . . . Most states could issue bonds without entering the market. They are now holding $8 billion in federal securities and and $1½ billion in private securities. . . . Many of those securities could be replaced with the state's own bonds."

—What about tax yields?

"State-local fiscal experience has shown that in time of business downturn and shrinking tax receipts the first casualty of retrenchment in aggregate spending supported from general tax revenues is the capital improvement program. . . . The type of public works supported by general taxes–schools, etc.–is most likely to be the first casualty of declining state-local revenues. . . . User-financed projects–water, sewer, and transportation facilities–usually declines less in a downturn than demand in most other sectors. . . . The rate of capital expenditure, therefore depends upon the user-tax yields, federal grants, and maintenance requirements."

—Face problem now

"In the state of Iowa unemployment in December and January approximated the figure for December '49 and January '50. . . . Can we expect some situations to absorb our unemployment? In my opinion, 'no,' unless the city, county, state and federal governments immediately recognize this malignancy and on all fronts move simultaneously to eradicate it. . . . I recommend (we) restore to the farmer 25% of the purchasing power he has lost, . . . consider lowering the age from 65 to 60 of those eligible for Social Security benefits, . . . institute public works with matching funds in cities and states that have unemployment problems. Let states and cities administer these funds."

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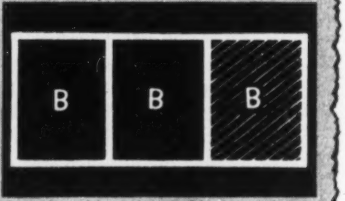

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Asphalt interests challenge jet airbase paving criteria

House group hears debate on new standards, boosting concrete requirements and setting cost differential

Competitive merits of asphalt and concrete as a paving material for jet airfields were vigorously debated in congressional hearings that ended last week.

Asphalt interests brought on the public hearings by lodging a strong protest against a recent change in Air Force pavement criteria. The revised standards greatly widened the required use of portland-cement concrete in so-called critical areas. Further, the new directive set up what the asphalt interests consider to be a cost differential in favor of concrete for the non-critical areas that are still open to asphalt competition.

A House Armed Services Subcommittee took testimony for four days. The subcommittee soon will be passing on some $700 million of new Air Force authorizations, including a number of airbases.

Asphalt people presented testimony supporting the adequacy of properly constructed asphaltic concrete pavement and they offered figures on airfield paving jobs to show actual and potential savings for that kind of construction.

Air Force officials in turn defended their recent decision favoring portland-cement concrete on the basis of engineering judgment, in light of what is known today about pavement and jet aircraft.

• How estimates are prepared—Tightening of pavement criteria, Air Force witnesses stated, is another step in the program preparing for full jet operation. Thus the directive issued last month makes the pavement requirements applicable to semi-permanent bases as well as to permanent bases in the continental U. S.

Critical areas on both kinds of bases must be paved with portland-cement concrete. In this classification are all apron areas, stub parking (hardstands), washracks, calibration platforms, warm-up pads and runway ends (1,000 ft).

Remaining areas—such as taxiways and center sections of runways—may be either portland-cement concrete or asphaltic concrete. Formerly, the choice was on a basis of first cost. But the new criteria introduce a procedure that the asphalt interests declare bears heavily against asphaltic concrete. Here is how it works:

Readying a new project, the contracting officer first estimates the cost for each of two possible paving schedules: (1) all-concrete pavement, and (2) a combination made up of portland-cement concrete for the critical areas and asphaltic concrete for the non-critical. Then, if the estimated cost for the combination schedule runs more than 15% below all-concrete, he prepares plans and specifications and invites bids only on the combination job.

But the spread in estimated costs is much more likely to be less than 15%. In that event, the contracting officer gets out bid invitations for both (1) all-concrete pavement and (2) the combination paving schedule. And, in the evaluation of these bids, concrete gets the benefit of a new differential. The job is awarded on a combination bid only if that bid is more than 5% under the lowest all-concrete tender.

• Weighting of costs questioned—It is this method of weighting the costs that draws objections from the asphalt industry, as Bernard Gray, president of the Asphalt Institute, told the committee. Not only is straight price competition for the non-critical areas ruled out by the new regulation, he explained, but the differential imposes much more than a 5% handicap on asphaltic concrete.

Committee questions brought out the fact that non-critical areas may constitute only one-fourth of the pavement yardage to be laid on a new base. In that situation, asphalt pavement would have to be some 20% lower than portland-cement concrete before a combination bid could beat an all-concrete bid by 5%.

Further committee questioning of Air Force people indicated that the weighting of the balance against asphaltic concrete might run to 25 or 30% on some projects. Contributing to this effect is the practice of lumping all costs, including drainage and other buried or incidental features, under a single-line item for pavement. This lumping in of costs that are common to both types increases the odds against the lower-priced pavement.

Air Force spokesmen admitted their preference for concrete wherever they could get it. They gave their opinion that a 5% premium is not too much to pay for an all-concrete field as compared with combination pavement.

• Differential is defended—John M. Ferry, special assistant for installations, said that reports from field commanders made it evident that concrete design offers advantages in view of progress toward a jet-powered Air Force. He declared that the Air Force has no option now but to proceed with the new criteria.

Ferry admitted that the Air Force has no firm engineering data, cost analyses or experience to back up the conclusion on the differential. "We picked 5% right out of the air," he told the committee. But he maintained that "in our best judgment, the 5% premium seems justified. Ferry cited demands from top Air Force generals for all-concrete pavements.

Maj. Gen. Lee B. Washbourne, Director of Installations, backed up Ferry's comment on the collective judgment that went into the setting of a 5% differential on overall cost. Washbourne estimated that in a total pavement program of $200 million to $250 million only about $15 million, at the outside, would be affected—presumably meaning that costs would be increased no more than that amount.

The Air Force Director of Operations, Maj. Gen. R. M. Ramey, mentioned some of the troubles encountered on asphalt pavement.

Ramey told of difficulties with fuel spillage disintegrating pavement surface, jet engines sucking up loose stones and tearing their blades, runway ruts causing an accident, and operations shut down at two fields for runway repairs. Much of the trouble comes from fields built before the jet era, he said.

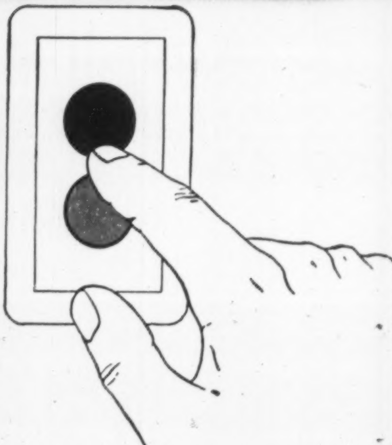
• Criticism of asphalt countered—Concluding his criticism of Air Force criteria, Gray said this about asphalt: "Either it is suitable or it is not. If not, then it shouldn't be used at all. But as it has thoroughly demonstrated its utility on millions of square yards of pavement, it certainly should receive equal consideration."

Inspection after inspection has been made, Gray said, of pavements on which spilled fuel damage was reported. Where construction with a dense mix had been properly carried out, he stated, injury was negligible.

Similarly, Gray declared, damage from jet blast is limited. Only a short section at most need be considered a critical pavement area at each end of a runway. As for damage from loose stones, he stated positively that "there is no reason for loose aggregate being present on a properly constructed asphalt pavement any more than on any other type."

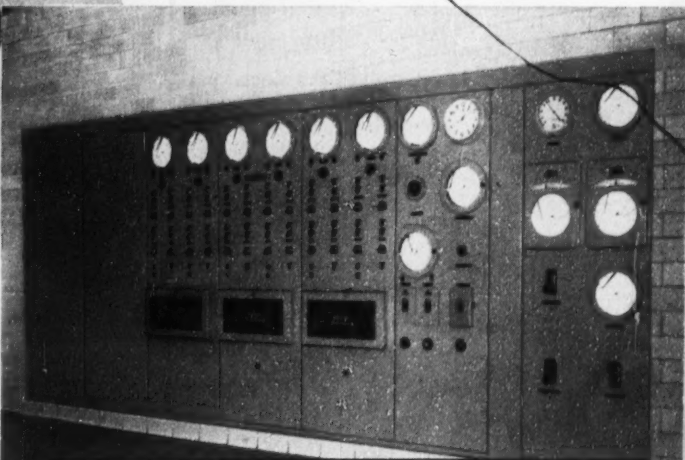
Gray expressed confidence, too, that a method soon will be found for treating flexible pavement to make it suitable for critical areas.

HOW BUILDERS *AUTO-CENTRAL* FILTER CONTROL REDUCES COSTS...



▲ Aldrich Purification Units and Filters at Alexandria plant of American Water Works Service Company.

Central control panel in pump and chemical feed building. From this board, the filter effluent and backwash rates are remotely controlled by means of Builders Auto-Central Control. ▶



The same type of automatic time-sequence operation which has won such wide acceptance for automatic home washing machines now comes to the modern water works. Here is one of the first installations of Builders Auto-Central (automatic-centralized) filter Control, proven by over three years of successful operation at the Alexandria Water Company in Alexandria, Va.

Builders Auto-Central Control has many advantages: It saves time — relieves plant personnel for other duties. It eliminates supervisory headaches. It insures accurate backwash rates, proper washing times, and helps to maintain maximum filter efficiency. It reduces construction costs by eliminating the need for shelter over conventional operating tables.

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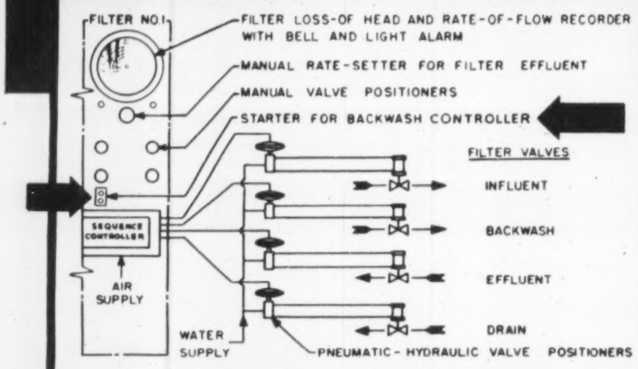
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STARTER FOR BACKWASH CONTROLLER
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Diagram of control panel for Filter No 1.
Operation may be manual or automatic as desired.

Auto-Central Filter Control is another example of Builders' pioneering in the water works field. For complete details on this or other types of Builders Water Works Equipment, write Builders-Providence, Inc. (Division of B-I-F Industries, Inc.), 390 Harris Ave., Providence 1, R. I.

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Agitate for licensing photogrammetrists

A row in California over licensing of photogrammetrists may reverberate in the California legislature at next year's session.

An indication of the anticipated skirmish developed at a legislative interim committee meeting in Sacramento recently.

Civil engineers claimed that all aerial map making by photogrammetry must be supervised by registered engineers.

It was revealed at the hearing that licensed engineers and land surveyors are protesting state contracts with nonlicensed firms doing photogrammetric work.

The state controller has been holding up payment of about $300,000 in fees to photogrammetric firms pending a clarification of whether or not only firms headed by licensed engineers or surveyors may be employed to do the mapping.

• **A separate profession?**—E. R. Polley, representing the Fairchild Aerial Surveys, Inc., of Los Angeles, told the committee that the problem might be solved by making photogrammetry a separate profession.

"Photogrammetry is concerned only in a minor way with land surveying and civil engineering," he stated. "There is no crying need for registration by the state, but if registration is deemed necessary it should be under a special board consisting of three photogrammetrists to one land surveyor."

Pointing out that non-engineers pioneered the technique, Polley said it would be unwise if the persons who developed the science should be excluded now because they are not engineers.

• **Holds engineers should supervise**—Jack Y. Long of Oakland, president of the California Legislative Council of Professional Engineers, testified it is in the public interest that the photogrammetry work be under the supervision of licensed engineers.

He contended that only a qualified engineer can give the maps the final checking needed to make certain they are accurate enough for use in engineering projects.

Present competition in the field makes it possible for the state to save manpower and money by awarding contracts on low bids, Russell S. Munro, deputy state public works director, told the committee.

Restricting firms by requiring them to be under licensed engineers would reduce the competition and may cause costs to rise. He asserted that about $20 million in highway project planning may be held up pending an attorney general's opinion as to whether the state can contract with non-engineers for the map making.

Gilford G. Rowland, Sacramento attorney representing several licensed engineers, insisted there are 16 firms in California headed by licensed engineers who can do the work. He said that they are not affected by the dispute and the state can hire them without delay.

The question of a code of ethics prohibiting civil engineers from entering into competitive bidding for jobs came up at the hearing.

Raritan clean-up

Sewer authorities move in two-pronged attack

Actions taken last week by the two separate agencies involved in clean-up of New Jersey's polluted Raritan River augured well for future progress.

The Baltimore consulting firms of Whitman, Requardt & Associates and Sheppard T. Powell were named to handle all engineering work of the newly formed Somerset-Raritan Valley Sewerage Authority in the upstream end of the valley.

These firms last year prepared a report for a Somerset County Citizens Committee on Water Supply and Pollution. In this report (ENR June 11, 1953, p. 27) they recommended an authority be established for financing design, construction and operation of a $7.75-million project—trunk sewer, complete treatment of 28 mgd plus water storage for low-flow control.

In the downstream end of the valley, Middlesex County Sewerage Authority signed, sealed and delivered 20 revised municipal and industrial service contracts last week. These call for total service charges of about $1 million a year (see ENR Dec. 18, 1952, p. 44 for a breakdown) to pay off construction and operating costs of the planned $22.5-million MCSA project.

Also last week, MCSA had negotiated a $1-million loan to cover engineering design, which is actually already under way. Consultants, previously named, are Metcalf & Eddy, Charles J. Kupper, Elson T. Killam and Bogert & Childs. Present plans call for preliminary designs in two months, contract drawings within a year, and revenue bond financing for the letting of contracts within 15 months. Construction would take another estimated 18 months.

VINNELL
125 TON
STEEL

Record plate girders will carry railroad over expressway

Four 125-ton plate bridge girders—said to be the largest ever built on the West Coast—will carry a railway over the new Los Angeles-Long Beach expressway in California. Measuring 130 ft long and 13 ft high, the girders have webs varying in thickness from ¾ to 1⅛ in. which are made up of sections of plate welded together. Flange plates and angles and the stiffening angles along the web are riveted. Four 35-ton mobile cranes, working in tandem, were used to erect each girder. Fabricator for the job was Vinnell Steel Co., Baldwin, Calif.; contractor was Webb & White Construction Co., Los Angeles.

Columbia River

Compact being drafted for early consideration in seven-state area

The first draft of a proposed seven-state compact governing the Columbia River and its tributaries will be completed in March.

A Columbia Interstate Compact Commission hopes to conclude hearings at the end of this year so that the final proposal can be submitted to the 1955 sessions of the state legislatures. The states involved are Washington, Oregon, Idaho, Montana, Wyoming, Utah and Nevada.

The compact is being written by Frederick L. Zimmerman, political science professor at Hunter College with the assistance of Mitchell Wendell of American International University. They teamed up in the drafting of compacts for the Delaware and Missouri Rivers among others. Both are now associated with the New York State's joint legislative committee on interstate cooperation.

Commission members visualize a permanent agency with headquarters probably in Spokane. It would occupy a unique position as the only agency blanketing all phases of river resource development: power, pollution, irrigation, fisheries, engineering and legal.

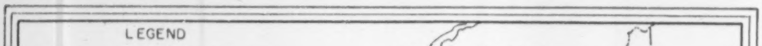
It has been decided to make the permanent commission's role advisory, rather than ask the state legislatures and Congress for regulatory or supervisory powers. How to finance the permanent agency's activities is still undecided.

The present compact commission, with 42 representatives of the states and federal agencies, was organized tentatively in 1950 and approved by Congress on July 16, 1952.

T. A. Middlebrooks dies; soil mechanics expert

Thomas A. Middlebrooks, 50, outstanding authority on soil mechanics and veteran staff member in the Office of the Chief of Engineers, U. S. Army, died Feb. 3 in Alexandria, Va.

Following graduation from the Georgia School of Technology in 1928, Mr. Middlebrooks joined the Corps of Engineers, Vicksburg, Miss., District. Since 1937 he had been in the Office of the Chief of Engineers as head of the Civil Works Engineering Division's Soils Branch.



500 miles of expressways proposed

Four additional toll expressways proposed by New York's Governor Dewey would total over 500 mi and cost almost $700 million. The routes: one would start on the new Thruway west of New York City and extend to Binghamton; one would run from Binghamton north to the St. Lawrence River; one from Albany north to the Canadian border; and one on Long Island from Brooklyn to Riverhead. Authorized extensions of the Thruway are west from Buffalo to the Pennsylvania line, east from below Albany to connect with an authorized toll road across Massachusetts, and a link to an authorized toll highway across Connecticut.

Readers' choice

Atomic power, toll roads selected as leading '53 engineering developments

Asked to select the engineering development of 1953 most likely "to shape for the better the future course of civil engineering and construction," readers of ENGINEERING NEWS-RECORD placed atomic power first and toll roads second.

Atomic power received four times as many votes and toll roads three times as many as the developments which were in third place or lower. Some readers mentioned atomic power in general, others the atomic submarine, a few selected President Eisenhower's speech to the United Nations on the sharing of fission products for peaceful purposes and several voted for the small atomic battery announced by RCA.

One reader seemed to express the general opinion when, in commenting on the President's proposal, he wrote, "Should this come to pass the profession of engineering will participate in the greatest advancement in its history. A new world of science and engineering will unfold, developing a scope of research and scientific analysis in which the engineer will play a major role."

The votes on toll roads were also scattered among the general and the specific. The majority focused on the general increase in toll roads, but numerous selections emphasized such specific projects as the New York Thruway, the Ohio Turnpike, the Garden State Parkway and the Indiana Turnpike.

Following atomic power and toll roads, the highest votes went to prestressed concrete, to lift-slab construction and to heavy precast concrete developments. Each of these categories received practically the same total vote.

Other developments which received multiple votes were the St. Lawrence Seaway; the Ohio Turnpike ruling that upheld the right of engineers to specify materials of their choice; the lessons from the fire that destroyed the General Motors factory at Livonia, Mich.; and the growth of unionization in engineering (which was held to be bad rather than good).

A majority of the votes were for specific projects. These are much too numerous to list, but those receiving more than one vote, honorable mention would go to the North Carolina State Fair Building in Raleigh; the Mackinac Straits Bridge; the Thule airbase in Greenland; and the Kitimat-Kemano hydro project in British Columbia.

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DELAWARE MEMORIAL BRIDGE

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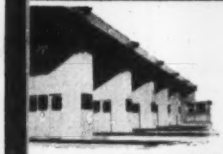
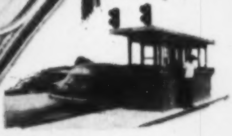


PENNSYLVANIA TURNPIKE

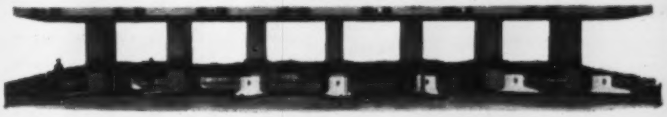
NEW YORK ZOOLOGICAL PARK



SANDY POINT PARK, MD.

FLUSHING MEADOW PARKING LOT, N. Y.

NEW JERSEY TURNPIKE



TRENTON-MORRISVILLE TOLL BRIDGE

COLEMAN MEMORIAL BRIDGE
YORKTOWN, VA.

AND MANY OTHERS, INCLUDING:

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Elizabeth River Bridge, Va.
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Oakland Bay Bridge, Calif.
Holland Tunnel, N. Y.-N. J.
Augusta Bridge, Maine
Bronx-Whitestone Bridge, N. Y.
Triboro Bridge, N. Y.
Charter Oak Bridge, Hartford
Rio Grande Gateway Bridge, Texas
Queens-Midtown Tunnel, N. Y.
Jones Beach Causeways, N. Y.
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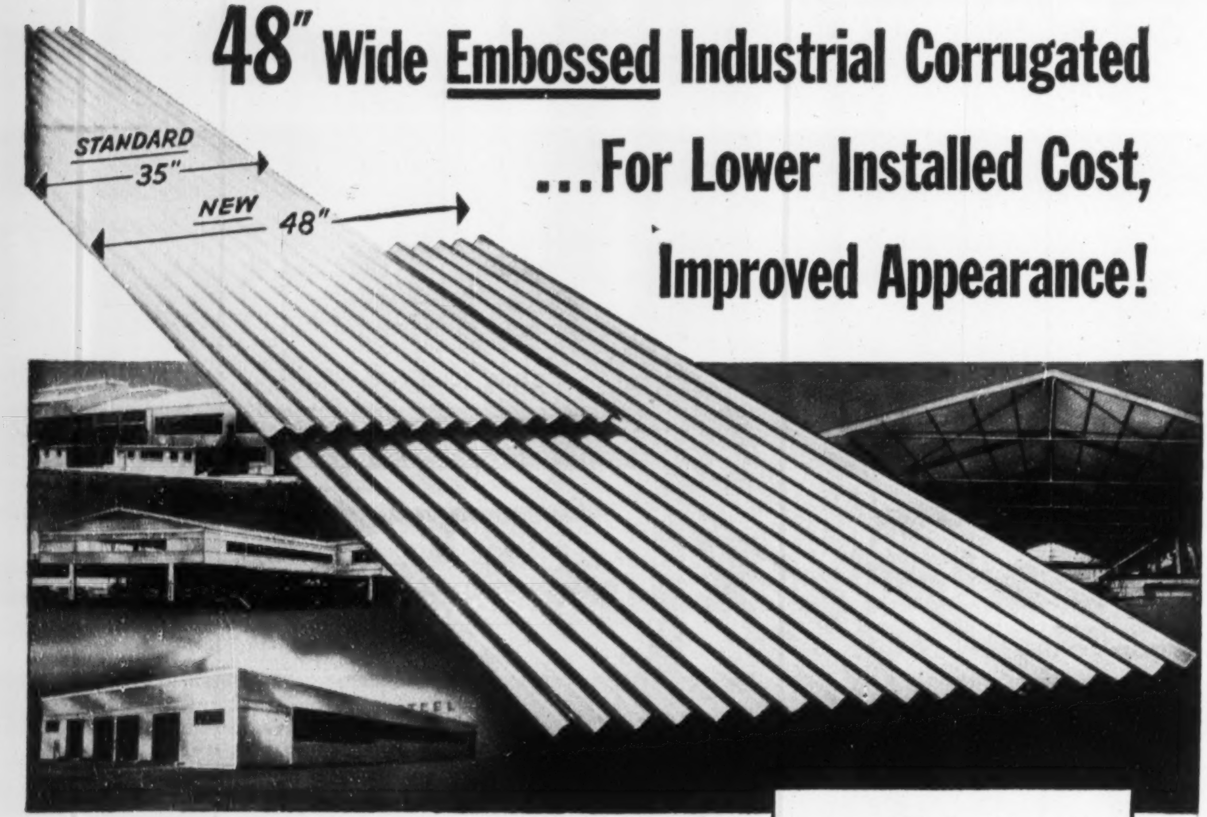

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Better Technology and Growing Demand Shape Construction's Future

(Continued from front cover)

THE influence of construction in the nation's economy was never more apparent than in 1953. A difficult transition—from vast capital expenditures for defense to an increase in investments for peacetime living—had to be faced. Yet construction accounted for one-eighth of all the goods and services that the country produced. In addition, of course, many other goods and services stemmed from facilities that construction had created in former years.

In these two facts—the huge capabilities of construction and the nation's needs for its products—are mirrored the sources of construction's strength. Within them reside the forces that will shape construction's future.

Construction is strong in one sense because, over the years, it has developed an arsenal of assets that can be brought to bear, effectively and swiftly, on any project, of whatever type or size. These assets include a collective mind constantly enriched by new increments of knowledge; a reservoir of manpower educated to the use of mechanical skills; a supply of materials ceaselessly under expansion in both quantity and quality; and a fleet of machines continuously being improved for greater productivity and new uses.

Taken together these assets help to make construction the big industry that it is. And the steadfast effort that has been made to increase and improve these assets has rendered this bigness effective. It is this dedication to the value of ever-better technology that constitutes one of the powerful forces that is shaping construction's future.

But U.S. construction is strong, too, because of a force outside of itself—that exerted by our adherence to the principle of an expanding economy. It is not alone that the population of the United States is growing, thus creating pressures for more construction related to the production of food, shelter and clothing. What characterizes an expanding economy—and differentiates it from mere expanding population—is a constant driving urge on the part of all of the population to raise standards of living far above these necessities of life. The resulting rising demand for the products of construction is the other force shaping construction's future. It, too, helps make construction big, but even more significantly such rising demand assures construction of a destiny to grow steadily bigger.

In 1954, these forces—better technology and growing demand—will be acting to keep construction on a healthy level. With respect to better technology, such of its ingredients as new increments of knowledge, more mechanization and increased research were never more widely appreciated. And as for growing demand, the principle from which it derives—that of an expanding economy—is still as bright and beckoning as ever.

Given these conditions, construction activity in 1954 may be expected to show the following characteristics:

- **Greatest expenditures**—These will occur in housing, highways, electric and gas utilities, industrial buildings, commercial buildings and military facilities.
- **Greatest growth**—This will be experienced in commercial buildings, school buildings, highways, water supply and sanitation.

In the pages that follow, this annual report documents the ability of a construction industry—already big and destined to be bigger—to produce these results.

Some ups, some downs; in all, a big year

The outlook—a slight drop in construction awards for '54, costs to be stable, and money easy to find

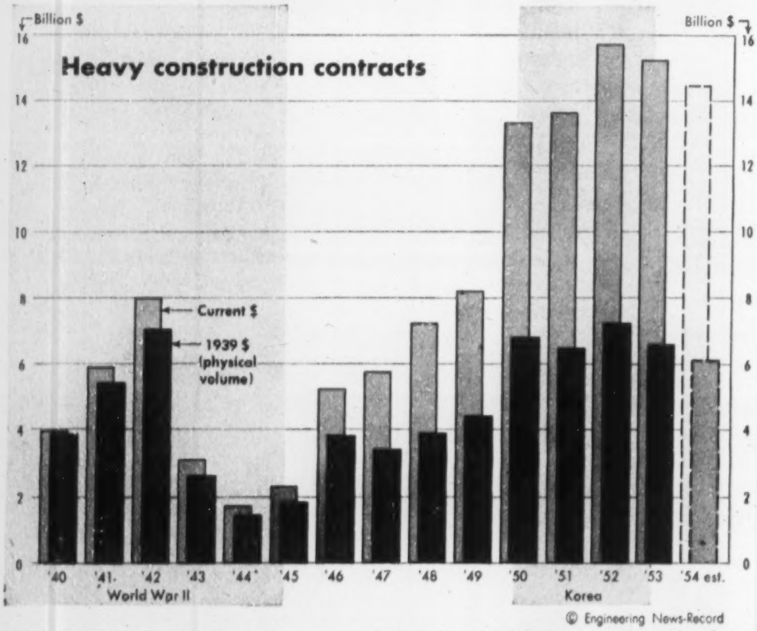
Construction is set for a wonderful year in 1954. ENR does not expect it will be the biggest year in history for heavy construction awards, but it will be plenty big enough—about 3% below 1953's total of $14.4 billion. That would make it the third best year for construction awards in history in terms of dollar volume. For 1953 was only slightly below the top year of 1952 (see chart).

The Department of Commerce estimates of all new construction show a different trend. It estimates that total new construction put in place rose to a new record high of $34.8 billion in 1953, up 7% from the previous high in 1952. For 1954, the Department of Commerce figures that new construction in place will be down 2%.

Engineering construction heads for third highest year

$14.4 billion in contract awards forecast for '54 is 3% under the '53 total

Type of work	Actual 1953 53 wks.	Estimate 1954 52 wks.	% change based on av. week
	millions		
All construction	**$15,171**	**$14,410**	**−3**
Public works	**$6,506**	**$6,535**	**+0.4**
State and municipal	5,088	5,335	+7
Federal	1,418	1,200	−15
Private construction	**$8,665**	**$7,875**	**−7**
Public . . .			
Waterworks	$247	$240	−1
Sewerage	431	460	+9
Bridges	1,792	2,000	+14
Highways	752	760	+8
Earthwork, waterways	374	325	−12
Buildings, incl AEC	1,736	1,775	+4
Housing	374	325	−12
Unclassified	805	650	−18
Private . . .			
Mass housing	$3,464	$3,200	−6
Commercial	1,157	1,300	+15
Industrial	3,178	2,700	−13
Unclassified	857	675	−20



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1953 IS SECOND HIGHEST in current dollars, but third highest in physical volume . . . '54 outlook is for 3% dip in dollars but a 6% decline in physical volume.

• **ENR forecast analyzed**—ENR estimates a 7% decline in private awards and a 15% decline in federal work which will be offset partially by a 7% gain in state and municipal awards (see table).

State and municipal work should reach a new high, topping $5.3 billion. The highway-building boom will continue this year, with toll roads and turnpikes playing a major role in pushing the total for highway awards to $2.0 billion. That would be 14% more than last year, which was itself a record year for highway awards. A more moderate rise is seen for bridges: They are expected to be up 8% to $760 million. New sewerage work should show a 9% increase to $460 million—new highs for both types of work. Non-residential public building should register a 4% increase, with schools responsible for much of the advance.

Other types of public work are expected to be lower than last year. Waterworks awards are expected to drop 1%; earthwork and waterways and public housing are both expected to drop 12%. Public unclassified (chiefly airports) is estimated to be down 18%.

In private work, the expected 7% dip would still leave a total of nearly $7.9 billion in private contracts during 1954. However, even including this dip, 1954 will be the second highest year on record.

Commercial building should rise 15% to a new high. But this will be offset by a 6% dip in private mass housing and declines of 13% in industrial building, and 20% in the private unclassified category. The latter is composed mostly of pipelines and electric transmission lines.

Behind this optimistic outlook for 1954 are:

1. The $16-billion volume of new projects proposed last year, which has pushed the heavy construction backlog to $74.1 billion . . .

2. The record amount of new money to finance construction which state and local governments and private corporations have been picking up from security sales both in 1953 and this year . . .

3. ENR's year-end survey of work on the drawing boards of consulting engineers and architects (ENR Jan. 7, p. 21) shows more work scheduled for 1954 construction than was scheduled for 1953 at the same time a year ago.

• Backlog

During 1953, new proposed work piled up in ENR's backlog at a faster pace than it did during 1952. The $16 billion of projects proposed was more than total contracts reported by ENR during the year. Proposed work was up 3.2% over 1952. However, net inflow—total new proposed work, less old projects removed from the backlog—was the lowest in three years (see chart).

The important role played by the construction backlog in sustaining the heavy volume of new construction is shown in the chart. Of the $15.2 billion in total contract awards reported during 1953, about half ($7.5 billion) are projects which came out of the backlog. Since 1945, the volume of contracts awarded which have first been in the backlog has been increasing. But in spite of the increasing outflow, the heavy inflow of new projects keeps pushing the backlog higher. It provides a strong base for a continued high level of construction contracts.

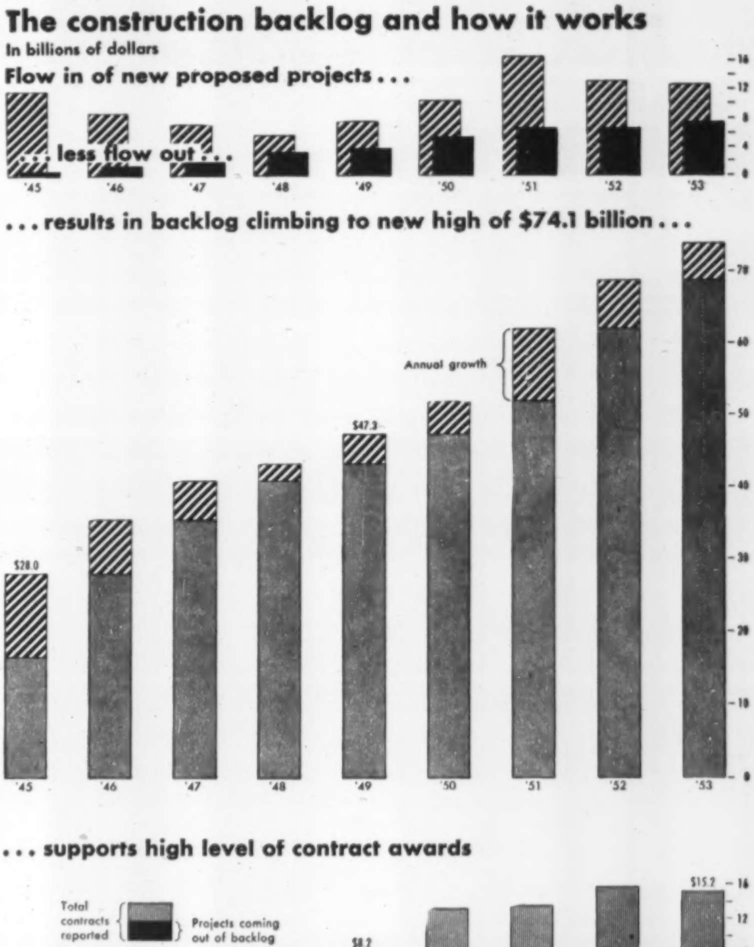
• Public projects—Proposed public work scored the biggest increase over 1952. It was up 6%, with projects estimated to cost over $8 billion. The big increase was in highway work. Toll roads and turnpikes helped boost the total of work proposed in 1953 to $2,544 million, up 137% above the cost of work proposed in 1952. Bridge projects showed a 39% increase, with $565 million proposed. Earthwork & waterways projects were pushed up 3% by the proposed $315-million hydroelectric plant on the St. Lawrence River, to be built by the New York State Power Authority.

Proposed sewerage work in 1953 was down 25% to a total of $477 million. Actually, however, the amount of sewerage projects proposed was very high, as has been the case ever since 1951 for this classification.

Waterworks projects proposed in 1953 were down 13%, to a total of $256 million. Public building projects were down 24%, reflecting in part the cutback taking place in federal construction.

• Private work—Private proposed work held steady in 1953, with new projects estimated to cost about $8 million. Commercial projects climbed 14%,

(Continued on page 56)



THE BACKLOG OF PROPOSED HEAVY CONSTRUCTION continues to grow in all sections of the country. It illustrates how and where U. S. construction needs are expanding faster even than construction is going ahead. It means that construction can continue to be one of the most dynamic forces in the national economy—a firm support for a high rate of business activity.

Proposed construction puts backlog over $74 billion mark

Engineering construction in planning stage, not yet under contract, sets new record high through December, 1953

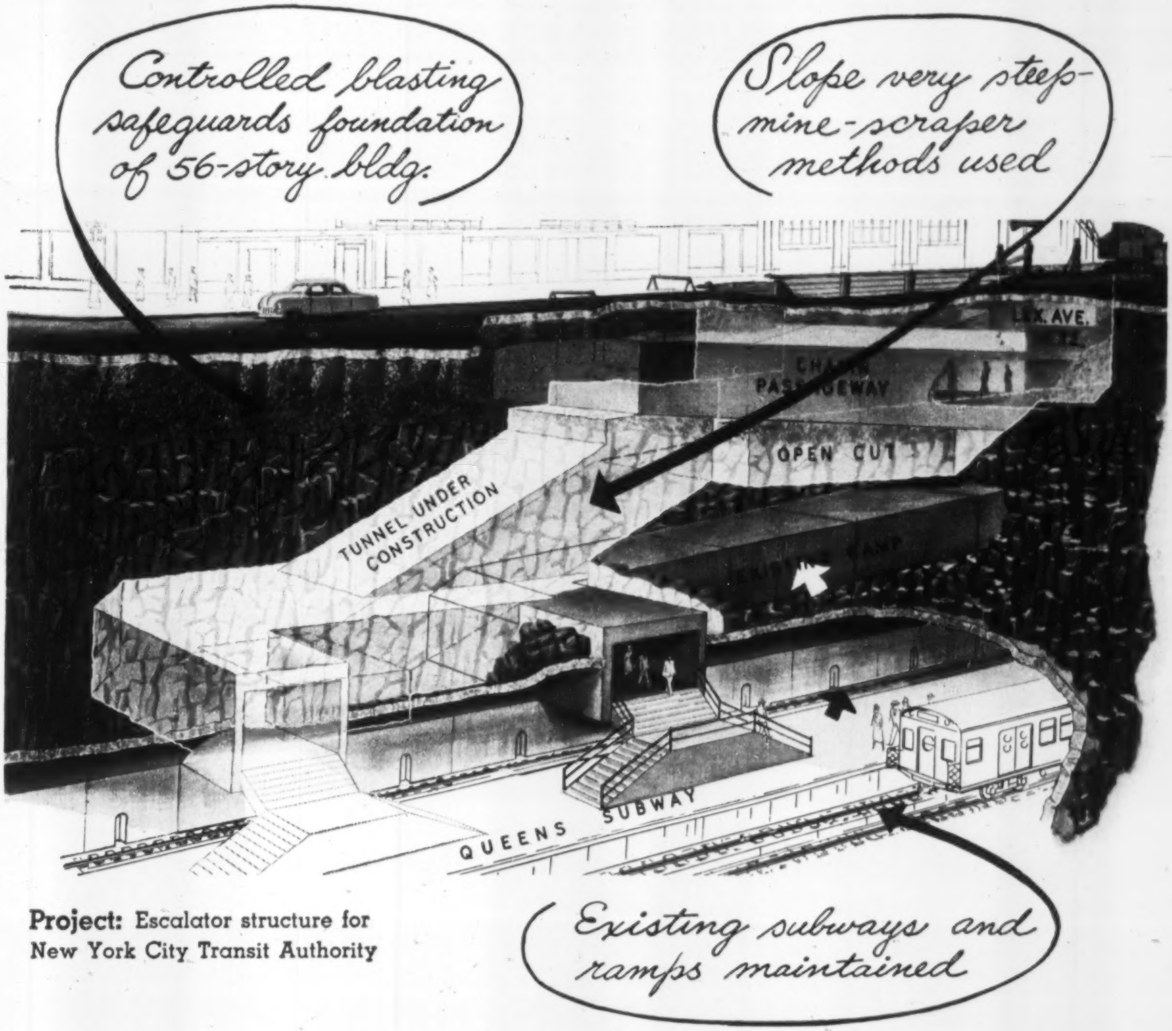
Summary of projects on file with ENGINEERING NEWS-RECORD covering proposed construction estimated to cost these minimum amounts or more: waterworks, excavation and irrigation, $34,000; other public works, $60,000; industrial buildings, $82,000; other buildings, public and private, $300,000

New projects proposed during 1953 .... (millions)	**$16,044**
Projects abandoned and removed from backlog ...... (millions)	**$3,264**
Projects moved out of backlog into contracts .... "	**7,452**
Net increase in backlog during 1953 .... "	**5,328**

Thousands of dollars (000 omitted)

	Public Works Projects								Private Projects			Construction				
States	**Water-works**	**Sewerage**	**Bridges (includes private)**	**Earthwork irr.-drain.**	**Streets and roads**	**Buildings, incl. pub. housing**	**Unclassified**	**Federal government work**	**Ind. buildings**	**Comm'l. buildings & housing**	**Unclassified**	**Private**	**Public**	**1953 Total**	**1952 Total**	**% change 52-53**
UNITED STATES																
1953	**1,581,620**	**2,902,418**	**2,366,424**	**8,600,505**	**7,315,090**	**14,993,989**	**6,728,339**	**12,671,275**	**10,715,810**	**11,306,341**	**7,545,531**	**29,646,101**	**44,409,966**	**74,056,067**	....	**+8**
1952	1,533,422	2,761,752	2,265,826	7,982,945	5,614,063	14,737,432	6,633,557	13,069,477	10,592,619	9,438,819	7,167,608	27,247,861	41,480,182	....	68,728,043	......
% Change	+3	+5	+4	+8	+30	+2	+1	−3	+1	+20	+5	+9	+7	**+8**	....	......
NEW ENGLAND																
Me	562	4,767	2,137	1,373	94,960	54,717	76,027	61,978	4,570	20,995	11,815	37,380	234,543	**271,923**	232,099	+17
N. H.	3,859	4,873	38,301	2,251	9,420	36,125	61,895	53,758	7,162	27,100	11,503	45,765	156,724	**202,489**	238,007	−15
Vt.	1,464	1,922	2,578	81,376	42,370	17,108	6,048	81,512	2,460	7,275	1,088	10,823	152,866	**163,689**	124,569	+31
Mass.	33,434	69,440	110,755	29,872	258,511	618,961	209,989	225,139	71,698	193,239	89,473	354,410	1,330,962	**1,685,372**	1,428,583	+18
R. I.	7,205	42,072	34,898	1,909	63,814	89,892	32,208	65,769	8,549	43,380	26,409	91,838	258,498	**350,336**	315,231	+11
Conn.	17,380	23,519	40,514	82,661	193,676	304,112	50,179	110,223	119,825	190,747	28,176	338,978	711,811	**1,050,789**	1,003,701	+5
1953	**63,904**	**146,593**	**229,183**	**199,442**	**662,751**	**1,120,915**	**436,346**	**598,379**	**214,264**	**482,736**	**168,464**	**879,194**	**2,845,404**	**3,724,598**	....	**+11**
1952	71,008	139,288	197,862	198,638	503,639	1,083,913	448,041	635,959	180,102	334,247	185,452	713,531	2,628,659	....	3,342,190	....
% Change	−10	+5	+16	+0.4	+32	+3	−3	−6	+19	+44	−9	+23	+8	**+11**	....	....
MIDDLE ATLANTIC																
N. Y.	233,453	366,077	178,536	522,676	636,356	2,480,250	1,390,110	463,100	497,935	1,762,946	185,148	2,446,355	5,807,132	**8,253,487**	7,452,279	+11
N. J.	67,801	71,792	147,699	22,354	411,232	500,482	281,915	178,552	374,344	437,073	84,098	895,515	1,503,275	**2,398,790**	2,087,852	+15
Pa.	77,197	178,256	179,295	221,897	837,771	785,256	381,629	405,770	487,243	912,932	221,227	1,625,451	2,657,252	**4,282,703**	4,072,878	+5
Md.	33,676	23,922	9,290	58,520	367,817	355,114	156,475	292,015	151,793	178,545	86,429	416,767	1,004,814	**1,421,581**	1,296,093	+10
D. C.	5,530	5,712	59,846	2,500	18,437	336,546	42,502	291,984	399	214,685	1,604	216,688	471,073	**687,761**	610,126	+13
Del.	1,741	9,762	18,772	48,302	46,245	56,027	24,895	76,861	29,774	75,090	35,797	140,661	205,744	**346,405**	275,623	+25
1953	**419,398**	**655,521**	**593,438**	**876,249**	**2,317,858**	**4,513,675**	**2,277,526**	**1,708,282**	**1,541,488**	**3,581,271**	**614,303**	**5,741,437**	**11,649,290**	**17,390,727**	....	**+10**
1952	424,935	671,617	625,695	500,533	2,050,636	4,401,732	2,145,456	1,720,164	1,511,828	2,905,466	556,953	4,979,372	10,815,479	....	15,794,851	......
% Change	−1	−2	−5	+75	+13	+3	+6	−1	+2	+23	+10	+15	+8	**+10**	....	......
SOUTHERN																
Va.	9,871	82,957	42,805	105,114	132,977	284,435	139,092	286,869	208,657	170,179	110,959	489,795	797,251	**1,287,046**	1,021,032	+26
W. Va.	2,952	36,539	1,610	25,509	28,472	87,344	31,647	64,971	92,236	20,559	35,137	148,107	213,898	**362,005**	424,129	−15
N. C.	23,728	27,315	9,374	201,536	36,821	216,655	39,905	301,363	198,534	91,051	104,148	394,011	555,056	**949,067**	898,476	+6
S. C.	18,191	16,267	9,417	94,503	18,163	122,619	164,518	260,640	160,349	66,535	48,254	275,138	443,678	**718,816**	703,039	+2
Ga.	19,628	23,885	21,614	17,843	54,814	292,564	38,359	69,763	97,400	90,603	62,115	250,868	467,957	**718,825**	650,053	+11
Fla.	32,613	52,520	48,589	56,656	350,233	230,506	178,498	182,399	170,644	294,177	93,964	559,035	949,365	**1,508,400**	1,412,774	+7
Ala.	26,377	28,098	11,264	59,163	21,874	238,935	43,841	179,790	110,577	55,861	166,195	332,633	429,552	**762,185**	566,398	+35
Miss.	8,162	8,178	2,878	27,483	8,401	62,529	33,996	56,224	52,748	38,463	193,445	285,906	150,377	**436,283**	432,191	+1
La.	23,901	23,252	123,071	99,438	105,248	129,757	90,384	163,547	249,119	46,184	299,408	595,510	594,252	**1,189,762**	1,158,082	+3
Ky.	10,650	23,524	8,286	38,181	3,256	147,513	16,649	99,641	209,250	75,070	109,081	393,401	248,059	**641,460**	551,519	+16
Tenn.	13,806	53,462	34,775	82,854	28,011	328,898	83,316	253,944	189,349	169,704	145,942	505,088	625,029	**1,130,117**	962,230	+17
1953	**189,879**	**375,997**	**313,683**	**808,280**	**788,270**	**2,141,755**	**860,205**	**1,919,151**	**1,738,863**	**1,118,386**	**1,368,648**	**4,229,492**	**5,474,474**	**9,703,966**	....	**+11**
1952	182,370	338,609	255,665	820,453	648,490	2,072,238	817,037	1,972,985	1,539,470	929,283	1,176,308	3,647,406	5,132,517	....	8,779,923	.....
% Change	+4	+11	+23	−1	+22	+3	+5	−3	+13	+20	+16	+16	+7	**+11**	....	.....
MIDDLE WEST																
Ohio	94,686	258,922	116,543	48,245	1,000,625	685,737	154,697	140,097	574,342	562,315	400,699	1,551,672	2,345,139	**3,896,811**	3,807,491	+2
Ind.	14,787	91,746	63,169	70,692	208,008	249,501	59,989	106,193	731,523	181,829	123,697	1,037,489	757,452	**1,794,941**	1,639,578	+9
Ill.	125,383	170,741	124,849	193,798	326,459	611,672	229,054	256,132	761,684	489,809	213,612	1,474,167	1,772,894	**3,247,061**	3,304,871	−2
Wis.	10,462	24,461	29,001	3,555	48,220	140,804	28,645	18,565	183,220	142,106	49,069	374,595	284,948	**659,543**	594,241	+11
Mich.	34,374	191,680	184,716	35,236	343,853	780,161	106,444	155,590	186,848	393,874	171,750	752,472	1,676,464	**2,428,936**	2,193,964	+11
1953	**279,692**	**737,550**	**518,278**	**351,526**	**1,927,165**	**2,467,875**	**578,829**	**676,577**	**2,437,617**	**1,769,933**	**958,827**	**5,190,395**	**6,836,897**	**12,027,292**	....	**+4**
1952	267,045	673,232	570,718	367,903	1,112,335	2,512,875	595,019	749,085	2,955,582	1,580,350	905,086	5,455,986	6,084,159	....	11,540,145	......
% Change	+5	+10	−9	−4	+73	−2	−3	−10	−18	+12	+6	−5	+12	**+4**	....	......
WEST OF MISSISSIPPI																
Minn.	20,053	44,183	18,191	7,435	16,914	166,186	32,207	17,767	111,268	85,134	127,996	325,923	303,644	**629,567**	877,168	−28
Iowa	4,818	15,824	11,824	72,743	7,526	69,350	8,584	68,401	36,154	41,706	164,081	243,121	189,489	**432,610**	446,566	−3
Mo.	35,868	76,887	58,980	199,048	299,637	419,301	95,010	388,616	706,859	272,551	258,333	1,240,292	1,182,182	**2,422,474**	1,801,868	+34
Ark.	18,437	26,352	29,142	281,727	21,989	111,101	81,996	337,889	305,004	28,486	186,758	520,463	570,529	**1,090,992**	1,077,085	+1
N. D.	3,452	3,230	143	149,640	......	13,178	3,733	150,149	1,135	7,637	46,137	54,909	173,376	**228,285**	229,296	−0.4
S. D.	3,096	2,031	480	167,539	2,312	8,946	17,160	174,167	2,415	4,487	49,140	56,042	201,564	**257,606**	276,513	−7
Neb.	11,234	32,248	11,851	146,460	13,934	133,177	68,004	197,804	43,859	41,050	84,846	170,755	415,908	**536,663**	596,540	−2
Kan.	26,372	67,513	13,416	216,911	118,112	217,826	71,669	346,397	199,685	48,883	237,682	486,250	731,819	**1,218,069**	941,111	+29
Okla.	31,333	21,471	15,852	277,318	61,238	145,831	99,400	341,531	106,242	54,711	194,560	356,002	651,954	**1,007,956**	978,408	+3
Tex.	277,929	244,865	120,977	914,832	158,201	1,138,491	829,613	1,306,879	2,185,799	1,529,451	1,235,045	4,974,475	3,660,728	**8,635,203**	8,304,450	+4
Mont.	7,175	3,437	62,186	321,612	8,511	41,955	19,104	327,411	21,125	14,969	12,043	48,137	463,980	**512,117**	484,666	+6
Wyo.	5,249	2,879	547	188,965	64	20,660	10,875	201,303	53,310	8,082	64,077	125,469	229,239	**354,708**	348,409	+2
Colo.	37,874	12,459	6,133	321,882	72,634	130,553	29,143	385,334	33,458	89,345	160,536	283,339	610,678	**894,017**	848,662	+5
N. M.	2,400	3,835	1,497	47,729	1,268	74,174	54,940	125,337	57,000	33,066	188,663	278,779	185,793	**464,572**	455,032	+2
1953	**485,290**	**557,214**	**351,219**	**3,313,841**	**782,340**	**2,690,729**	**1,421,438**	**4,368,985**	**3,863,313**	**2,259,558**	**3,009,897**	**9,163,956**	**9,570,883**	**18,734,839**	....	**+6**
1952	439,090	515,345	321,738	3,158,730	648,147	2,666,793	1,416,898	4,476,863	3,433,730	1,983,061	3,082,242	8,510,807	9,154,967	....	17,665,774	....
% Change	+10	+8	+9	+5	+21	+1	+0.2	−2	+12	+14	−2	+8	+5	**+6**	....	......
FAR WEST																
Idaho	3,106	6,038	7,195	116,931	29,511	67,671	25,022	170,417	11,828	21,546	191,969	225,343	255,474	**480,817**	491,475	−2
Utah	15,282	17,383	4,589	130,544	22,869	39,695	15,496	139,427	6,568	54,063	112,966	173,597	245,858	**419,455**	385,247	+9
Ariz.	5,087	4,043	....	577,577	16,039	20,333	57,753	623,006	54,898	57,232	146,410	258,540	680,832	**939,372**	936,873	+0.2
Nev.	9,963	1,734	4,453	35,995	9,996	17,688	14,553	23,127	18,602	18,970	44,184	81,756	94,382	**176,138**	163,533	+7
Wash.	51,214	32,694	150,849	999,876	237,547	664,729	248,531	1,250,178	194,329	215,852	164,793	575,614	2,384,800	**2,960,414**	2,762,812	+7
Ore.	5,678	10,651	26,831	206,401	32,734	66,277	9,652	239,626	101,533	26,107	124,211	251,851	358,224	**610,075**	596,461	+2
Calif.	53,127	357,000	166,706	983,843	488,010	1,182,647	782,988	954,120	532,507	1,700,687	640,859	2,874,926	4,013,448	**6,888,374**	6,268,759	+10
1953	**143,457**	**429,543**	**360,623**	**3,051,167**	**836,706**	**2,059,040**	**1,153,995**	**3,399,901**	**920,265**	**2,094,457**	**1,425,392**	**4,141,627**	**8,033,018**	**12,474,645**	....	+7
1952	148,974	423,661	294,148	2,936,688	650,816	1,999,881	1,211,106	3,514,421	971,907	1,706,412	1,261,567	3,940,759	7,664,401	....	11,605,160	......
% Change	−4	+1	+23	+4	+29	+3	−5	−3	−5	+23	+13	+13	+5	**+7**	....	......
CANADA																
1953	**186,952**	**264,145**	**351,789**	**704,130**	**1,467,830**	**1,722,056**	**1,253,723**	**660,974**	**1,637,868**	**1,722,682**	**1,468,897**	**4,831,221**	**5,948,851**	**10,780,072**	....	**−3**
1952	188,476	254,511	337,361	557,489	1,507,196	1,722,850	1,224,407	632,795	1,801,188	1,027,186	2,482,957	5,311,605	5,792,016	....	11,103,621	......
% Change	−1	+4	+4	+26	−3	−0.1	+2	+4	−9	+68	−41	−9	+3	**−3**	....	......

ANOTHER PROBLEM SOLVED BY SPENCER, WHITE & PRENTIS


Controlled blasting safeguards foundation of 56-story bldg.
Slope very steep—mine-scraper methods used
LEX. AVE.
OPEN CUT
TUNNEL UNDER CONSTRUCTION
QUEENS SUBWAY
Existing subways and ramps maintained

Project: Escalator structure for New York City Transit Authority

TUNNELING IN ONE OF THE WORLD'S MOST CONGESTED SUBSURFACE AREAS

The subsurface of Manhattan, opposite Grand Central Station, is a veritable honeycomb of building foundations, gas mains, tunnels, water pipes, sewers, electrical cables, etc. Here, a tunnel was required for the largest-capacity escalator in the country. To build this tunnel, amid such vast congestion, was the task of Spencer, White & Prentis as successful bidder.

No "rubber stamp" thinking would suffice; 30-degree slopes do not yield readily to ordinary rock removal methods. A scraper adapted from the mining industry solved that particular problem, as others were solved in other ways. Result? From start to finish the job progressed smoothly on schedule and without any interruption of existing services.

CATALOGUE ON REQUEST

FOUNDATIONS
PILING
UNDERPINNING
SHORING
COFFERDAMS
SPECIAL SERVICES

SPENCER, WHITE & PRENTIS INC

10 EAST 40TH STREET, NEW YORK 16, N. Y.
DETROIT: HAMMOND BLDG. • CHICAGO: 134 SO. La SALLE ST. • WASHINGTON, D. C.: TOWER BLDG.
IN CANADA: SPENCER, WHITE & PRENTIS OF CANADA, LTD.
TORONTO: 700 BAY ST. • MONTREAL: 2052 ST. CATHERINE ST., WEST

$15.2 billion in contracts makes 1953 second highest year

Engineering construction 5% below '52 record, but highways, bridges, waterworks, sewerage & commercial set new highs

Summary of projects reported to ENGINEERING NEWS-RECORD covering construction awards for these minimum amounts or more: waterworks, excavation, and irrigation, $34,000; other public works, $60,000; industrial buildings, $82,000; other buildings, $300,000

Thousands of dollars (000 omitted)

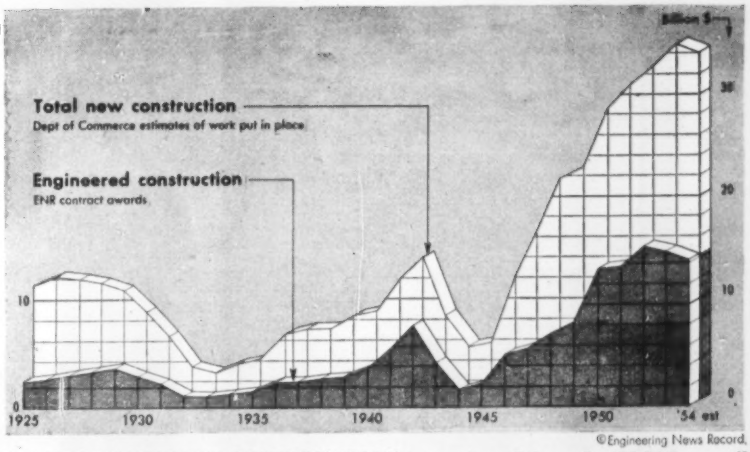
	Public Works Contracts									Private Contracts							
						Buildings					Commercial Buildings		Construction				
States	Water-works	Sewer-age	Bridges†	Earth-work Irr.-drain	Streets and roads	Resi-dential	Other	Unclassi-fied†	Federal govern-ment work	Industrial Buildings	Resi-dential	Other	Private	Public	1953 Total 53 weeks	1952 Total 52 weeks	% change '52-'53
UNITED STATES																	
1953	247,011	431,200	752,275	374,251	1,792,452	375,505	1,736,483	1,662,494	1,417,572	3,178,129	3,464,156	1,156,937	8,665,316	6,505,577	15,170,893	......	−5
1954	231,058	304,372	413,200	495,908	1,396,532	606,272	4,292,575	1,381,498	4,501,049	2,722,369	3,001,941	843,519	7,112,618	8,576,626	......	15,689,244	......
% Change	+5	+37	+78	−25	+26	−39	−60	+18	−69	+15	+13	+35	+20	−26	−5	......	......
NEW ENGLAND																	
Me.	149	360	3,693	81	12,628	......	2,952	17,509	15,088	27,557	8,760	1,200	40,017	34,872	74,889	59,965	+23
N. H.	184	352	1,420	131	7,103	......	2,097	46,612	2,227	9,718	1,875	4,870	61,857	12,505	74,362	18,210	+301
Vt.	339	125	1,471	43	3,687	578	927	429	688	742	......	1,115	1,917	7,539	9,456	11,318	−18
Mass.	18,671	6,817	10,576	3,068	34,837	33,419	52,034	41,111	34,808	19,889	32,333	35,787	88,454	200,291	288,745	338,194	−16
R. I.	419	3,020	1,699	807	3,814	1,334	8,711	1,960	7,037	1,485	12,133	12,900	27,018	21,061	48,079	46,045	+2
Conn.	793	7,644	1,826	621	9,494	17,206	42,627	2,105	2,344	13,048	21,168	22,898	57,689	81,741	139,430	149,845	−9
1953	20,555	18,318	20,685	4,751	71,563	52,537	109,348	109,726	62,192	72,439	76,269	78,770	276,952	358,009	634,961	......	−0.1
1952	6,664	22,725	32,450	4,102	77,180	66,059	107,187	77,502	77,967	82,279	104,591	42,838	253,088	370,489	......	623,577	......
% Change	+203	−21	−38	+14	−9	−22	+0.1	+39	−22	−14	−28	+78	+7	−5	−0.1	......	......
MIDDLE ATLANTIC																	
N. Y.	5,002	27,904	75,809	4,658	352,263	49,347	140,186	56,390	32,619	31,830	524,541	183,222	744,618	706,534	1,451,152	1,166,377	+22
N. J.	1,413	39,985	45,905	1,798	95,358	3,511	43,273	52,078	50,760	77,616	199,479	13,300	292,306	281,410	573,716	327,851	+72
Pa.	6,279	31,058	35,006	14,797	108,225	23,634	114,224	19,615	31,370	132,094	320,281	81,468	536,421	350,260	886,681	689,391	+26
Md.	16,566	9,613	9,962	1,170	27,906	14,123	62,960	8,845	32,932	16,816	140,429	25,039	184,803	148,626	333,429	283,138	+16
D. C.	564	4,087	7,879	......	4,607	4,444	14,593	267	12,223	874	11,577	18,995	31,446	36,441	67,887	83,076	−20
Del.	422	2,854	701	164	2,395	......	7,648	6,983	10,234	18,748	39,413	8,000	67,764	19,564	87,323	95,566	−10
1953	30,246	115,501	175,262	22,587	590,754	95,059	382,884	144,178	170,138	277,978	1,235,720	330,024	1,857,358	1,542,835	3,400,193	2,645,399	+26
1950	22,080	52,612	108,461	12,094	262,271	151,304	369,259	109,787	226,361	250,267	1,029,344	277,920	1,583,494	1,061,905	......	......	......
% Change	+34	+115	+59	+83	+121	−38	+2	+29	−26	+9	+18	+17	+15	+43	+26	......	......
SOUTH																	
Va.	4,909	3,248	6,863	1,355	26,974	14,038	56,705	37,047	54,889	44,796	100,344	17,101	163,811	149,569	313,380	373,090	−18
W. Va.	406	1,667	22,678	529	69,659	......	9,460	9,005	1,198	19,876	1,200	8,335	37,634	105,181	142,815	37,715	+272
N. C.	6,287	6,160	7,613	710	25,194	18,094	21,086	29,609	31,293	23,225	29,232	18,693	81,075	104,828	185,903	248,064	−26
S. C.	5,994	4,389	5,274	1,506	14,761	7,493	28,132	24,738	16,034	20,967	8,034	7,768	48,525	80,531	129,056	180,700	−30
Ga.	6,769	5,061	6,975	3,143	19,745	13,995	71,386	29,396	26,780	55,441	63,063	26,952	155,810	146,116	301,926	319,895	−7
Fla.	7,002	29,279	9,665	7,462	22,852	6,332	30,068	44,014	44,215	38,072	168,658	48,090	261,758	149,736	411,494	385,101	+5
Ala.	5,303	6,240	6,710	1,034	26,961	5,959	46,585	36,671	35,628	25,678	13,648	11,603	62,179	124,213	186,392	177,843	+3
Miss.	1,964	1,615	8,086	2,417	18,073	2,794	10,970	36,137	3,013	5,028	6,500	4,077	49,617	48,044	97,661	122,666	−22
La.	8,387	3,857	6,972	8,741	26,803	26,340	30,881	75,727	23,775	31,743	39,025	14,173	142,209	130,440	272,649	355,654	−25
Ky.	2,033	3,395	4,315	4,584	29,559	6,242	22,372	34,700	16,440	34,119	14,849	20,809	102,646	74,331	176,977	716,841	−76
Tenn.	3,791	13,835	3,695	4,202	15,799	5,695	68,199	52,663	62,808	63,959	54,971	17,827	184,121	120,515	304,636	804,102	−63
1953	52,845	78,746	88,846	35,683	296,380	106,982	395,844	409,707	316,073	362,904	499,524	195,428	1,289,385	1,233,504	2,522,889	......	−33
1952	43,584	43,664	70,503	91,649	260,706	165,617	1,401,074	358,828	1,551,293	523,092	650,466	112,488	1,400,772	3,230,899	......	3,721,671	......
% Change	+19	+77	+24	−62	+12	−37	−72	+12	−80	−32	−25	+70	−10	−63	−33	......	......
MIDDLE WEST																	
Ohio	12,980	17,808	138,323	850	118,765	14,106	56,452	79,005	35,544	313,553	387,714	77,545	816,114	400,987	1,217,101	1,891,782	−37
Ind.	9,039	11,935	11,441	495	10,939	1,172	22,322	30,802	12,149	336,157	76,553	27,200	464,965	73,090	538,055	220,744	+139
Ill.	3,760	25,847	33,085	4,325	65,457	21,122	54,810	36,699	17,786	175,032	300,481	81,510	586,992	215,136	802,128	632,610	+24
Wis.	3,311	10,910	5,782	378	38,377	534	34,503	12,882	11,204	26,832	7,429	21,534	63,556	98,916	162,472	167,980	−5
Mich.	8,088	18,507	87,689	97	44,373	23,139	91,966	22,691	8,092	184,796	140,855	50,425	392,246	280,380	672,626	524,510	+26
1953	37,178	85,007	276,320	6,145	277,911	60,073	260,053	182,079	84,775	1,036,370	913,032	258,214	2,323,873	1,068,509	3,392,382	......	−3
1952	40,696	59,990	67,486	12,599	254,552	60,624	1,510,831	97,299	1,363,171	612,544	489,947	231,058	1,380,831	2,056,795	......	3,437,626	......
% Change	−11	+39	+302	−52	+7	−3	−83	+84	−94	+66	+83	+10	+65	−49	−3	......	......
WEST OF MISSISSIPPI																	
Minn.	1,136	6,542	2,930	1,639	36,834	1,384	35,920	4,751	7,063	378,549	8,700	25,157	415,763	87,779	503,542	120,430	+310
Iowa	1,708	4,391	7,897	1,593	29,965	1,005	12,186	6,801	3,320	24,783	2,826	3,919	35,643	61,431	97,074	177,844	−46
Mo.	6,359	6,120	31,069	4,731	30,053	10,822	57,837	23,175	39,742	60,328	97,381	28,764	194,164	162,475	356,639	326,298	+7
Ark.	3,250	947	1,390	6,267	10,360	1,952	3,457	17,930	10,449	8,074	18,300	2,017	44,577	29,367	73,944	184,127	−61
N. D.	720	1,559	1,921	25,734	12,967	368	4,781	10,727	30,222	40,219	......	3,398	54,148	48,246	102,394	44,172	+128
S. D.	1,020	646	1,057	40,524	13,667	......	2,224	4,876	45,845	100	7,226	700	9,190	62,850	72,040	69,779	+1
Neb.	4,936	1,452	1,351	6,819	12,111	1,976	15,850	26,429	24,858	5,825	32,942	9,038	58,337	60,392	118,729	121,330	−4
Kan.	2,633	4,143	8,155	20,850	27,732	567	13,087	29,728	36,504	20,912	25,685	10,824	69,276	95,040	164,316	224,552	−28
Okla.	5,062	6,772	8,968	3,559	18,306	......	15,052	27,416	18,534	29,029	29,693	23,817	94,016	73,658	167,674	218,200	−25
Tex.	40,673	48,651	23,764	13,903	104,213	9,608	103,749	334,086	85,425	389,324	329,655	106,773	1,068,483	435,916	1,504,399	1,587,142	−7
Mont.	58	107	1,834	3,222	16,803	1,212	2,501	12,107	11,020	19,425	......	1,353	31,296	27,326	58,622	91,084	−37
Wyo.	292	507	1,226	667	10,526	......	2,300	12,412	2,194	1,504	500	731	14,641	16,024	30,665	42,025	−28
Colo.	3,200	1,564	2,109	2,443	18,250	4,346	12,283	7,670	6,999	29,307	909	13,043	46,983	48,141	95,124	125,980	−26
N. M.	1,891	2,246	1,626	3,447	12,275	1,351	18,313	44,208	36,221	5,219	......	3,445	35,810	58,211	94,021	72,902	+27
1953	72,938	85,647	95,297	135,398	354,062	34,591	299,540	562,316	358,396	1,012,598	553,817	232,979	2,172,327	1,266,856	3,439,183	......	−1
1952	76,819	74,106	74,588	148,943	370,131	96,438	373,290	525,267	570,690	1,008,203	522,718	135,362	1,946,711	1,459,154	......	3,405,865	......
% Change	−7	+13	+25	−11	−6	−65	−21	+5	−38	−1	+4	+69	+46	−15	−1	......	......
FAR WEST																	
Idaho	......	625	985	8,642	13,838	908	10,352	25,828	33,124	185	......	1,500	12,089	50,774	62,863	109,689	−44
Utah	1,183	1,280	549	63	9,794	......	9,667	6,884	2,478	37,823	......	1,234	44,963	23,514	68,477	62,693	+7
Ariz.	1,512	251	1,463	5,048	12,596	......	23,412	27,856	19,920	750	800	......	17,792	55,896	73,688	77,825	−7
Nev.	......	820	......	439	5,557	......	3,638	15,662	13,538	2,250	940	617	7,822	22,161	29,983	27,233	+8
Wash.	4,712	3,541	19,966	35,758	33,037	2,708	80,318	55,718	129,525	114,069	10,496	11,632	155,800	216,155	371,955	470,947	−23
Ore.	1,209	3,541	8,681	70,476	35,806	......	10,410	11,260	82,325	23,762	2,340	2,075	33,595	135,965	169,560	125,102	+33
Calif.	24,633	37,923	64,221	49,201	91,154	22,647	151,017	111,280	145,088	237,001	171,218	44,464	473,360	531,399	1,004,759	981,617	+0.4
1953	33,249	47,981	95,865	169,687	201,782	26,263	288,814	254,488	425,998	415,840	185,794	61,522	745,421	1,035,864	1,781,285	......	−6
1952	41,215	51,275	59,712	226,521	171,692	66,230	530,934	212,815	711,567	245,984	204,875	43,853	544,722	1,307,384	......	1,855,106	......
% Change	−21	−8	+58	−28	+15	−61	−46	+17	−42	+66	−11	+38	+34	−22	−6	......	......
CANADA																	
1953	23,707	20,278	15,408	21,905	63,275	15,379	139,809	187,203	117,163	476,408	209,534	109,451	910,841	371,516	1,282,357	......	+6
1952	20,814	18,791	31,355	156,698	41,856	43,376	120,351	323,820	233,733	219,551	144,189	61,655	596,003	586,453	......	1,182,456	......
% Change	+12	+6	−51	−86	+48	−65	+14	−43	−51	+113	+43	+74	+50	−38	+6	......	......

† Incl. private: Bridges, public $743,350 ('53), $395,211 ('52); private $8,925 ('53), $17,989 ('52) Unclassified, public $805,325 ('53), $854,698 ('52); private $857,169 ('53), $526,800 ('52)

totaling $1,539 million. Mass housing projects rose 43% to a total of $2,083 million. But industrial buildings continued to decline last year. Proposed projects in this category added up to $2,972 million, down 16% from the year before and about half the volume of the peak year, 1951.

• Financing

State and local governments sold a record amount of bonds last year to finance new construction. The total, computed by ENR, was $5,031 million. That is 44% more than in 1952—and 1952 was a very good year. Of course, quite a bit of this money went to pay for contracts awarded in 1953 and prior years. But much of it will be available to finance new 1954 contracts.



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HEAVY ENGINEERED CONSTRUCTION is tapering off from the '52 high . . . all construction put in place is expected to dip 2% below '53 peak in '54.

The biggest increase in bond flotations, 310%, was for bridge construction, a total of $347 million. Highway bonds climbed to $1,394 million, a 62% increase. All other types of work, except for public housing and unclassified, posted large gains. They ranged from 81% for sewerage projects to 35% for public schools.

Corporations also borrowed heavily in 1953 to finance heavy construction. Sales of stock and debt securities for new construction rose 18% to a postwar high of $4.3 billion. This compares with a 24% boost in 1953 contracts for heavy industrial construction (ENR's industrial building awards, plus private unclassified awards).

This huge volume of bond financing came in a year when the cost of borrowing swept through a wide range (chart, page 63). During the first half of 1953 money rates rose sharply. This rise was partly caused by the large volume of issues being brought to market. And it was partly brought about by the new Administration's moves to tighten money rates, in order to check inflation.

By the middle of the year, the Administration had decided that inflation was no longer a problem, and took steps to ease the money market. The cost of borrowing declined almost as sharply as it had risen, until by year end Standard & Poor's average yields on the various bond groups were down approximately to the level where they had been at the start of 1953. Bond yields have been declining ever since. Because credit-worthy borrowers will now be able to borrow fairly cheaply, the stage is set for another big construction year.

You can see the rapid rise and decline in the cost of money from Standard & Poor's average bond yields. Municipal rates had the steepest rise, from 2.47% in January to 2.99% in June, and then down to 2.59% in December. Industrial bond yields rose from 2.94% in January to 3.32% in June, and down to 3.00% for December.

• Materials

Fabricated structural steel shipments jumped 17% in 1953 to a new postwar high of over 3.1 million tons. During the first 11 months, shipments of reinforcing bars hit a new record of over 1.7 million tons. That's 8% above 1952, and slightly above the previous postwar high set in 1951 (table page 63).

Portland cement shipments also set a new high. They totaled 260.9 million bbl, up 4% over 1952.

(Continued on page 63)

Industrial plant contracts set new records

Largest number, 2,998 private plants, awarded for $3.178 billion to make 1953 second only to '51 dollar volume record. Process industries, power plants and metal refining and rolling lead.

Industry	1951 No.	1951 Value	1952 No.	1952 Value	1953 No.	1953 Value
Transportation Service						
Railroad	54	$21,515,000	48	$22,283,000	64	$27,620,000
Automotive	211	43,227,000	173	34,798,000	240	55,515,000
Public Utilities	126	737,493,000	116	405,560,000	123	700,921,000
Process Industries[1]	651	1,450,297,000	574	1,271,693,000	551	917,737,000
Food Industries[2]	286	80,798,000	270	102,434,000	368	151,580,000
Metal Refining & Rolling	76	862,935,000	39	281,440,000	37	573,287,000
Metal Working Plants						
Auto Factories	24	74,645,000	28	55,674,000	33	282,935,000
Aircraft Factories	45	118,492,000	44	63,637,000	38	29,165,000
Foundries	28	5,396,000	12	2,733,000	17	2,191,000
Mach. & Mach. Parts	586	492,440,000	459	265,256,000	471	186,086,000
Radio & TV & Electronics	27	62,451,000	16	14,292,000	28	24,801,000
Textiles (excl. rayon)	79	28,873,000	78	20,730,000	91	27,845,000
Wood Industries	47	8,963,000	54	18,449,000	55	8,568,000
Miscellaneous						
General Factories	687	133,663,000	728	163,045,000	866	181,356,000
Refrig. & Cold Stor.	10	2,338,000	3	345,000	16	8,519,000
Total, priv. financed	**2,937**	**$4,123,526,000**	**2,642**	**$2,722,369,000**	**2,998**	**$3,178,129,000**
Fed. Owned Indus. Plts.	**158**	$581,741,000	**264**	$2,870,745,000	190	$276,037,000

[1] Includes distilleries

[2] Includes breweries, frozen food plants and lockers.

Unclassified work tops all but war record

Private and state and municipal unclassified awards set new all-time highs in '53, led by pipelines, but low federal awards hold total to $1.66 billion, 28% below '52 record.

	1951	1952	1953
Private			
Transmission Lines	$74,224,000	$85,428,000	$54,233,000
Pipe Lines	365,226,000	185,565,000	525,933,000
Railroads	47,250,000	35,553,000	39,501,000
Telephone	16,618,000	41,686,000	22,783,000
Drive-In Theatres	3,262,000	6,807,000	2,938,000
Radio	5,244,000	5,154,000	15,899,000
Airports	11,939,000	20,870,000	9,786,000
Other	147,049,000	145,737,000	186,096,000
Total Private	**670,812,000**	**526,800,000**	**857,169,000**
Public—Federal			
Airports, Airbases	234,103,000	96,673,000	125,821,000
Hangars, Buildings	183,024,000	242,457,000	248,402,000
Airport Housing	103,773,000	99,797,000	25,736,000
Airport Facil. & Util	106,683,000	128,724,000	85,179,000
Shipyards	12,601,000	33,707,000	38,627,000
Other	150,813,000	113,070,000	68,516,000
Total Federal	**790,997,000**	**714,428,000**	**592,281,000**
Public—State & Municipal			
Airports	**51,423,000**	46,400,000	41,251,000
Subways, Tunnels	11,402,000	25,360,000	36,310,000
Other	92,314,000	68,510,000	135,483,000
Total State & Mun	**155,139,000**	**140,270,000**	**213,044,000**
Total Public	**946,136,000**	**854,698,000**	**805,325,000**
Total Unclassified	**$1,616,948,000**	**$1,381,498,000**	**$1,662,494,000**

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. . . from engine to tires Power Transmission engineered and manufactured by Clark

Faster, heavier, with greater horsepower than any tractor shovels of comparable capacity, MICHIGAN* Tractor Shovels move material faster, last longer and cost less to operate! Check these vital mechanical superiorities . . .

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Short Turning Radius

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Four Speeds Forward
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Model 75-B—1 cu. yd.	bucket drive, rear steer
Model 75-R—1 cu. yd.	rear drive, bucket steer
Model 75-A—1 cu. yd.	all-wheel drive, rear steer
Model 125-A—1⅓ cu. yd.	all-wheel drive, rear steer
Model 175-A—2¼ cu. yd.	all-wheel drive, rear steer

For Full Information . . .

All the facts concerning these important new machines are assembled in the MICHIGAN Tractor Shovel FACT-FOLIO—a handy and useful file containing specifications and action photographs. The coupon will bring your copy.

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Construction Machinery Division
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Firm Name__________________________________

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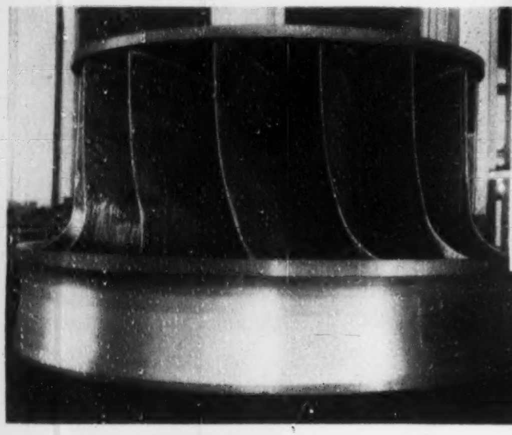
POWER by SMITH

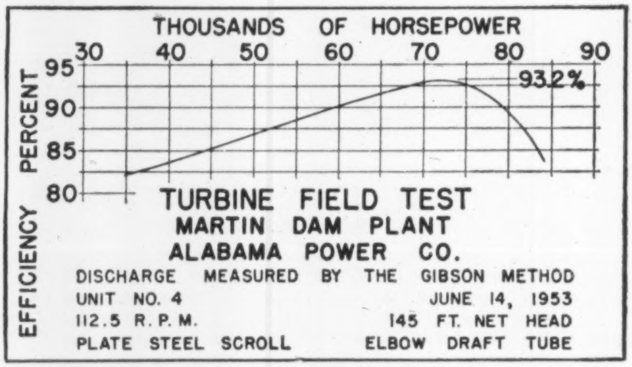
16,000,000 HORSEPOWER

View showing powerhouse extension at Martin Dam for Unit No. 4



SMITH-FRANCIS runner for this installation. Weight 107,700 pounds. Overall dimensions 15'-6" diameter by 8'-7" high. Actual capacity exceeds guaranteed power by 7%. Operation is smooth and quiet.

78,000 HP
in a
45,000 HP
SETTING



Alabama Power Company wanted to utilize all of the available regulated flow in the Tallapoosa River at Martin Dam. They were gratified to learn that SMITH found 78,000 HP possible. Restrictions for space and setting were approximately the same as for each of the three existing 45,000 HP turbines.

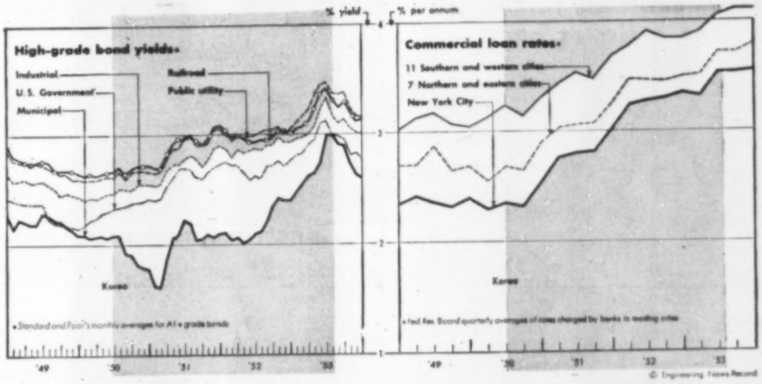
The above test performance data shows 83,800 HP developed during field tests. *This is testimony to SMITH engineering skill and experience.*

S. MORGAN SMITH Co.
YORK, PENNA. U.S.A.

Production of Douglas fir plywood is estimated at 3.5 million sq ft for 1953 by the Douglas Fir Plywood Assn.—a rise of 15% over 1952.

Total lumber shipments for the first 11 months, as reported by the National Lumber Mfgrs. Assn., show nearly a 2% climb. However, most of the gain was made in the first seven months. Since July, monthly shipments have been running behind the corresponding months of 1952. So the 1953 total may be about the same as in the previous year.

Shipments of common brick should end up 1953 slightly ahead of 1952. In the first 11 months, they totaled over 5.3 billion, a rise of 2% over the same 1952 period.



COST OF LONG-TERM BORROWING dropped from postwar peak in mid-'53 and should dip further in '54 . . . interest charges on bank loans are levelling off.

• Employment

The number of workers employed in contract construction during 1953 averaged 2,538,000, close to the 1952 level and only slightly under the high 2,588,000 set in 1951.

Employment in nonbuilding construction was up 1% to a postwar high in 1953, averaging about 456,000 per month during the first 11 months, according to preliminary figures of the Bureau of Labor Statistics. In building construction, the number of workers was down a little more than 1% from the previous year. Employment averaged 2,044,000 per month for the first 11 months.

• Equipment

As of the end of the third quarter of 1953, total shipments of earthmoving and excavating machinery topped $638 million, about 2% ahead of the same 1952 period, which had set a record. Figures for the fourth quarter were not available from the Dept. of Commerce at presstime. However, reports from the field indicate that fourth-quarter shipments should be under a year ago. In other words, shipments for the full year will not beat 1952. But business will still be close to a record.

To quote one leading manufacturer: "The construction equipment business is today being operated as it more normally is operated, without any backlog to speak of. Contractors expect and get fast delivery once again. New orders are on a satisfactory basis, however, especially for equipment that offers further operational cost saving to the contractor."

The nine-months figures show that shipments of two major types of construction equipment were well ahead of the previous year. Tracklaying tractor shipments were $262.5 million, a thumping 28% rise over the 1952 period. Machinery for mounting on tractors (bulldozers are the big item here) showed a 7% increase. Shipments were valued at $61.6 million for the nine months.

Shipments of portable blast hole drills also showed an increase—up 25%. But other types were behind 1952. Declines ranged from 2% for power shovels to 34% for wheel-type tractors. Road construction and maintenance machinery dropped 23%, and heavy-duty off-highway types of tractors and trailers were down 3%.

• **Equipment prices** climbed an average of 3.8% in 1953, according to the Bureau of Labor Statistics index of manufacturers' prices. Most of this rise came right after price controls were dropped in February. The 1953 rise is exactly twice the percentage increase in 1952, when controls had been on tight.

The biggest price increase was in tractors—up 6.3%. Power cranes and shovels went up 4.7%, and mixers and pavers climbed 4.2%. Other increases; hand-held air tools up 3.7%; specialized machinery, 3.4% higher; machinery for mounting on tractors, up 1.4%.

The only price category to show a decline was scrapers and graders, which dipped 0.2% in 1953. In the two full years 1952 and 1953, this the price index for this category has climbed only 0.9%. There was no change in portable air compressors, which have been at the same level since January 1951.

• **1953's weather**—ENR started the detailed weather forecasts, supplied by the U. S. Weather Bureau (ENR July 16, 1953, p. 41).

The main weather feature was drought, which jumped from one area to another, often reappearing in the same region, until by early summer it covered nearly the entire southern

(Continued on page 64)

'53 shipments close to record for most key materials

Structural steel, wrought aluminum and plywood gain the most

	Units in Millions	1951	1952	1953*	% chg '52-'53
Alum wrought products‡	lbs	1,756	1,924	2,309	+20
Cement, US bu Mines	bbl	241.153	251.369	260.889†	+ 4
Fabr struct steel, AISC	tons	2.702	2.664	3.118†	+17
Reinf steel, AISI	tons	1.893	1.813	1.904	+ 5
Unglazed brick‡		6,176	5,635	5,720	+ 2
Vit clay sewer pipe‡	short tons	1.544	1.545	1.560	+ 1
Unglazed str tile‡	short tons	1.172	0.920	0.911	− 1
Lumber, NLMA	bf	36,423	37,724	38,101	+ 1
Softwood	bf	29,495	30,097	29,796	− 1
Hardwood	bf	6,928	7,627	8,085	+ 6
Douglas fir plywood, DFPA Production	sf on 3/8" basis	2,867	3,050	3,500	+15

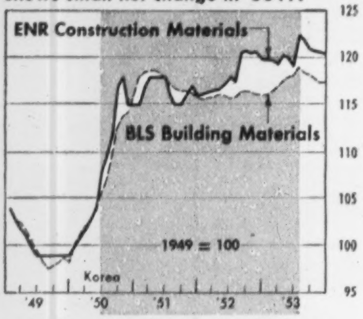
* ENR—estimates based on 11-mo figures.

† Final, 12-mo.

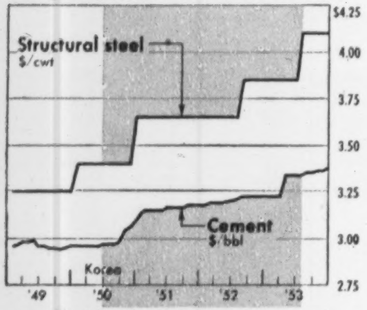
‡ U.S. Bu of Census.

Costs continue to climb, but at a slower pace in '53

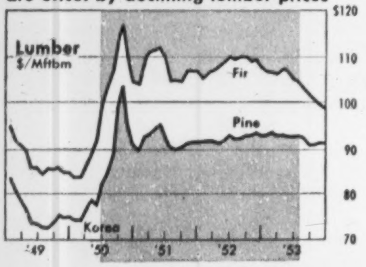
ENR Materials Price Index shows small net change in '53 . . .



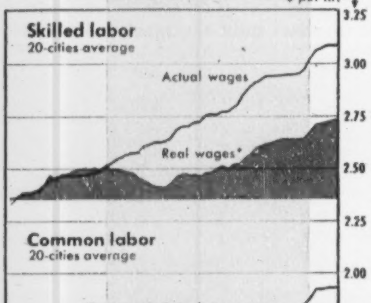
as higher prices for steel and cement . . .



are offset by declining lumber prices



Construction workers won another round of big wage increases, including fringe benefits, but these were smaller than in '52 . . . stable cost of living meant corresponding large gains in purchasing power . . .



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interior. By the end of June, showers were checking the drought in the Corn Belt, and brought relief to most of the South in July.

Drought-breaking rains caused floods in the South in May and late August and heavy rains caused floods in the upper Mississippi valley in June.

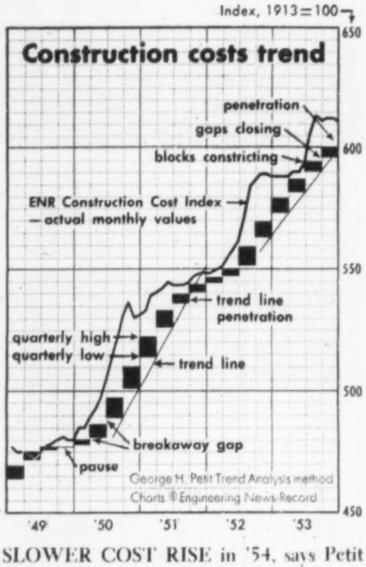
• Construction Costs

This year will be a good year to buy new construction. For the rise in construction costs, as measured by ENR's indexes, has been slowing down, and can be expected to slow down further in 1954 (Petit chart). The Construction Cost Index rose 4.4% during the year, compared with a 7.3% rise during 1952. The Building Cost Index climbed 2.8%, compared with 4.7% in 1952.

After the price controls were dropped in February 1953, the price of Portland cement rose an average of 4.7% in the 20 cities covered by the ENR construction and building cost indexes. In June, the mill price of structural steel rose by 6.5%. However, part of the effects of these increases were offset by declining lumber prices, which fell 6% between December 1952 and the end of 1953, according to the 20-cities average for fir and pine 2x4's (chart).

Labor rates continued to advance during 1953, but not as fast as in the previous year. Common labor rates in the 20 cities climbed 6.2% in the 12 months of 1953. Bricklayers' rates rose a modest 2.9%, while carpenters won an average pay boost of 6.1%, and structural iron workers' pay rose 6.9%. Practically all the wage increases this year meant higher real wages and range benefits, since the cost of living (as measured by the government's consumer price index) was only 1% higher in December 1953 than it had been 12 months before.

• 2% limit—Construction costs this year probably won't climb more than 2%. Structural steel prices are expected to be stable. Cement may move up 2% to 3%, while lumber prices could decline another 2%. Wage boosts are expected to hold within 4% for common labor—compared with nearly 6% in 1953. There may be an increase of around 3% in wages of the three skilled construction trades, compared with a 4.5% in 1953.



SLOWER COST RISE in '54, says Petit cost trend chart, because blocks are constricting, gaps are closing, and trend line has been penetrated.

• Price indexes—Contractor building price indexes showed a smaller increase in 1953, on the average, than the ENR cost indexes. The average increase in the five contractor indexes. (Austin, Aberthaw, Fruin-Colnon, Fuller, and Turner) was 2.4% between the last quarter of 1952 and the fourth quarter of 1953.

In the field of highway construction, bid prices in the second quarter of 1953 actually declined 4.5% from the all-time high set for the first quarter in the Bureau of Public Roads composite mile index. Bid prices firmed for the third quarter following boosts in wage rates and in steel prices. But they still were only 0.6% above the second quarter, and at the lowest level since the first quarter of 1952.

This smaller rise in building price indexes and the drop in highway bid prices, compared with the rise in cost of materials and labor, reflects the increasing competition between contractors which became evident in 1953 (ENR Aug. 20 '53, p. 21). This sharper competition has resulted in more managerial efficiency, and in some cases lower profit margins. The situation has been eased somewhat by the fact that materials are becoming more available and deliveries more predictable than in previous years.

• Conclusion

To sum it all up:

- 1954 will be a good year, with plenty of work but with increasing competition.
- Financing will not be expensive for borrowers with good credit ratings.
- Construction costs will continue to stabilize. Plenty of materials will be available, and labor will not be in tight supply. There will be no long delays in getting equipment.

PEDESTRIAN BRIDGE for Mt. Carmel High School, Lawson, Kentucky. This is one of the smallest suspension bridges designed and fabricated by American Bridge in many years. Structure was erected by the faculty and students of the school.

Study in Extremes
by
AMERICAN BRIDGE

SAN FRANCISCO-OAKLAND BAY BRIDGE fabricated and erected by American Bridge is the world's greatest. It is 8½ miles between terminals of which 4½ miles is steel superstructure over San Francisco Bay.

Most people associate American Bridge with *big* bridges. And that's understandable, for they're the ones that make the headlines.

But, American Bridge also builds small bridges. In fact, we have recently designed and fabricated a part of an exceptionally small suspension bridge. We show it here. And to give you a better idea of the wide variety of our work, we also show a picture of the famous San Francisco-Oakland Bay bridge, the world's greatest bridge.

What a study in extremes! The little pedestrian bridge is only 402′ 7½″ long and 6′ wide, while the main structure for the tremendous San Francisco-Oakland Bay bridge is 22,720′ long. It has two main suspension spans, each 2,310′ long. The main span of the tiny foot bridge measures but 244′ 7½″! The total weight of the smaller structure is approximately 25 tons; steel for the larger job weighs 201,000 tons!

Contrasting these two bridges is just another way of saying that no bridge is too large or too small for American Bridge. We have the fabricating facilities, erecting equipment and technically trained personnel to handle any type of steel construction with exacting precision, thoroughness and speed . . . any time, anywhere. For detailed information regarding your requirements, call our nearest office.

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The new sound and color motion picture—*Building for the Nations*—a candid, factual photographic record of the highlights of the fabrication and erection of the United Nations Secretariat Building in New York is now available for free showing in churches, schools, clubs and industries. For bookings, write Pittsburgh office.

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PREPAKT ANNOUNCES NEW *Mixed-in-Place* GROUTING TECHNIQUE FOR FOUNDATION STABILIZATION...

Here's a remarkable new construction technique!

Now, soils can be stabilized in place . . . load-bearing piles placed without objectionable pile-driving vibration . . . cut-off walls constructed without excavating, shoring or backfilling . . . cofferdams installed (to replace sheet piling) which reduce excavation, eliminate backfill and later serve as outside forms.

All this and much more can be done with Prepakt's revolutionary development—*Mixed-in-Place Intrusion Grouting*.

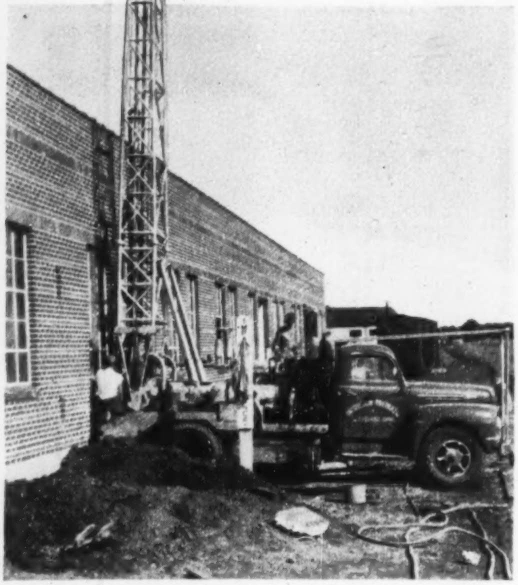
Economical and easy-to-use, the procedure consists of injecting Intrusion grout through a hollow shaft to a rotating drill head which mixes it with the soil in place. The soil is not withdrawn—but is used as the aggregate. The result: a pile-like column of considerable load-bearing capacity useful for both bearing piles and cut-off walls.

The mixed-in-place grout piles, which may be up to 24 inches in diameter, can be made in most any soil including clay, silt, sand and gravel. Pile strength varies with the type of soil and is as great as concrete in sand or gravel.

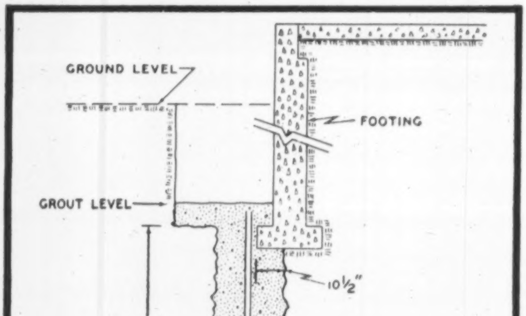
All necessary equipment is truck-mounted on a single, highly mobile rig which can operate in locations normally inaccessible to pile-driving units. Other advantages over driven piles include (1) no damaging vibration or ground heaving and (2) higher skin friction between elements and soil.

Prepakt's *Mixed-in-Place Intrusion Grouting* gives the construction industry a new "tool" for solving difficult foundation problems.

For further information on Prepakt's new *Mixed-in-Place Intrusion Grouting* technique, contact the Main Office, Room 779-L, Union Commerce Bldg., Cleveland.



BUILDING SETTLEMENT HALTED—Some 60 Mixed-in-Place Intrusion Grout piles were used for underpinning an Omaha warehouse being damaged by continued settlement. Photo (above) shows truck-mounted rig in action close to building. Use of 24" bit allowed 10½" of blade to work under spread footing for better support. Diagram (below) indicates that Prepakt method minimized excavation and eliminated casting of pile cap.



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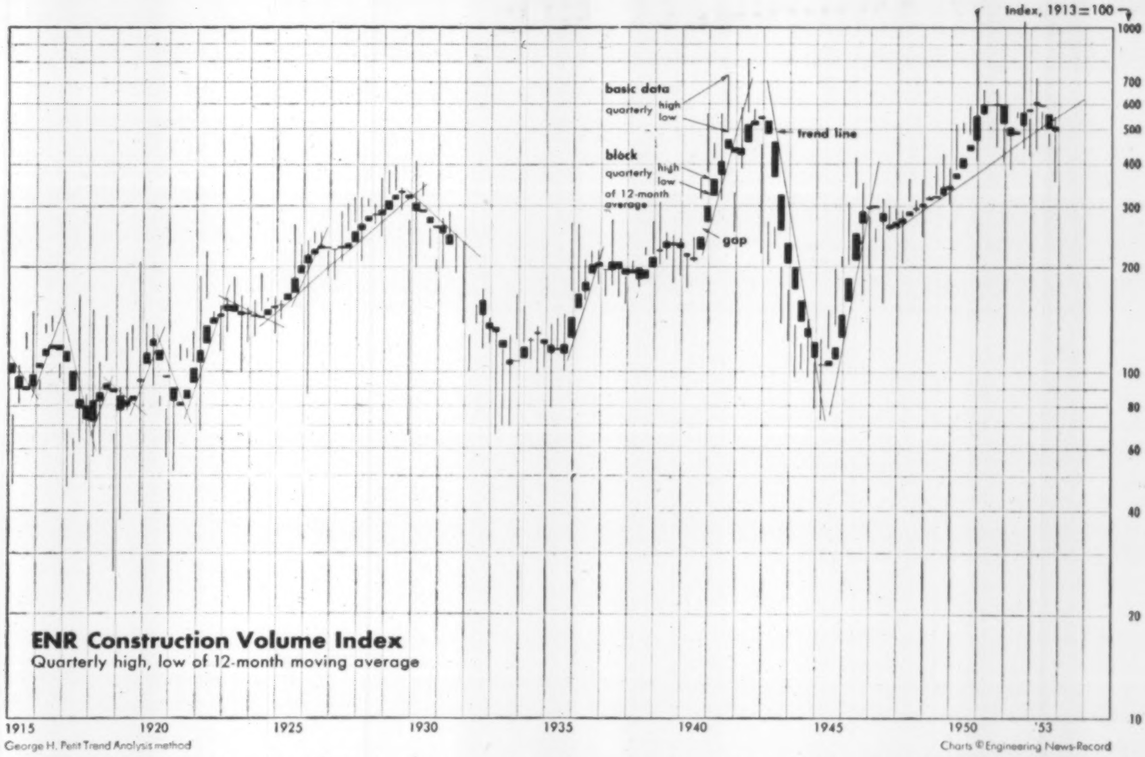


CONSTRUCTION VOLUME INDEX shows how physical volume of construction flows into contracts. It deflates dollar volume by correcting for cost rise. Moving averages smooth curve to reveal major trends.

Index puts realism into construction outlook

On this fact all can agree—Americans since 1950 have invested more dollars in construction than were ever poured into such fixed improvements before.

But how much construction are we getting for this money? Some construction we can measure by the foot, some by the mile, some by the cube, some by the square, some by the ton, some by the pound. If you want to add these together into their composite whole, the dollar is obviously the only practical common denominator.

But the dollar isn't a perfect measure either: A cubic yard is always a cubic yard; a foot is always a foot. But a dollar shrinks and expands. Some years it buys more construction than it does in others.

• **A closer measure**—One purpose of this study is to take this stretch out of the construction dollar and thus to measure construction without inflation or "ex-inflation" as it has been called. There are two methods of doing this. One of them, the constant dollar, is used in the chart on p. 54. There the dollar volume of construction has been divided by the cost index to deflate the actual dollars to 1939 values.

Here we are going one step farther, to a volume index where construction in current-dollar volume has first been reduced to 1913 constant dollars and then to an index based on 1913 volume as 100. It is this index that is shown in the accompanying charts.

It is obvious that we are getting more construction, ex-inflation, than we have ever had before, but the increase over earlier accomplishments is modest indeed. Certainly this is no runaway overbuilding boom.

• **Base for future**—Now from this realistic base in the known present, how far can we peer into the future? What effect will the gradual stabilizing of our dollars have on the construction outlook?

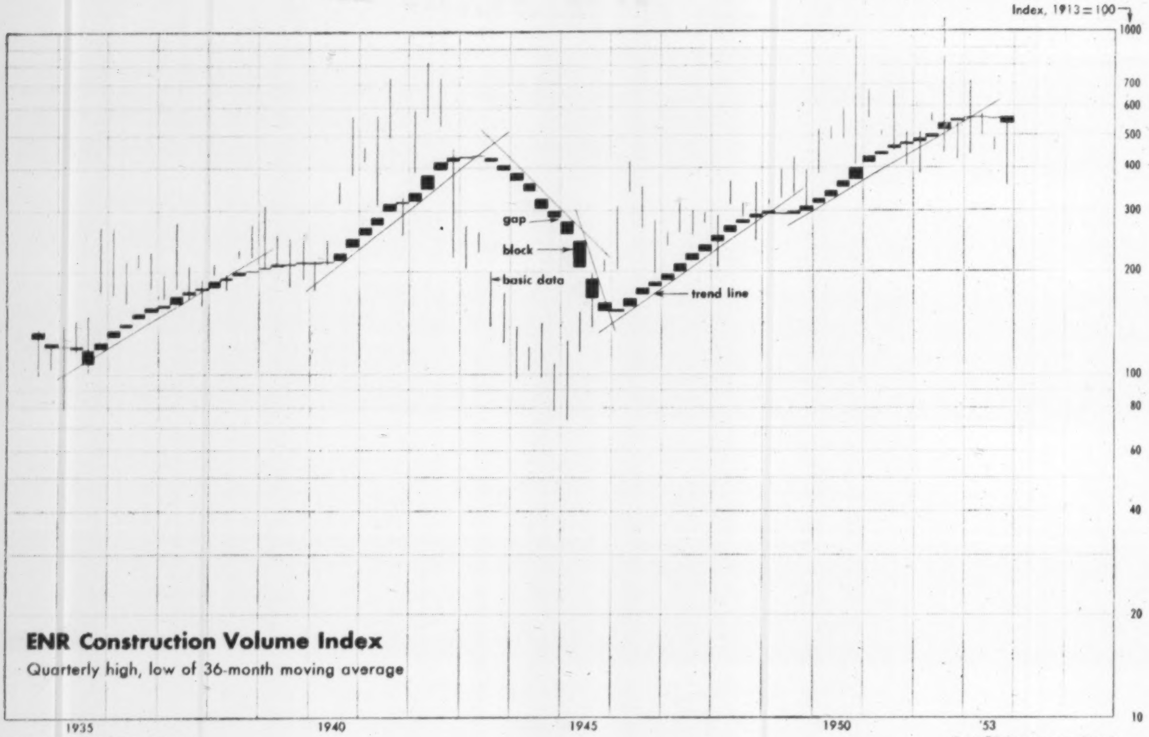
Besides coming in many different forms, construction flows into the market, not at a uniform rate, but in erratic surges and sags, as the charts show. The thin vertical lines on the charts connect the high month with the low month in the contract awards index each quarter, the basic data.

To tame these wild ups and downs, 12-month moving averages are charted to form the black blocks which connect the high and low moving average for each quarter. Now we can apply the Petit Trend Analysis Method which is familiar to students of the ENR Cost Indexes (ENR October 8, 1953, September 4, 1952). This employs three indicators: The blocks themselves, to measure strength of the movement; the gaps between them, to measure its momentum, and the trend lines to measure changes in its direction.

Another refinement has been included in this volume index curve. It is plotted on a semi-logarithmic scale to show the true rate of change in volume.

It is apparent, in inspecting this, that when blocks expand and gaps open up the trend is gaining strength and momentum. When blocks shrink and gaps close, it is losing strength and slowing down. When blocks pull away from the trend line the movement is speeding up. It is ending when the blocks penetrate the trend line.

The new "rabbit-ear" pattern in the 1950's is produced by big government atomic energy construction con-



ENR Construction Volume Index

Quarterly high, low of 36-month moving average

George H. Petit Trend Analysis method

Charts © Engineering News-Record

tracts. It is further complicated by construction controls set by the government after the Korean fighting began, and by later resumption of this deferred construction when these controls were relaxed. Thus, two short-range uptrends in volume appear above the long-range trend.

Each of these short-range trend lines has been penetrated. But more significant the long-range trend line was penetrated in the third quarter of '53. This was accompanied by a breakaway gap on the down side and an expanding block.

• Conclusion reached—Mr. Petit interprets this to mean that construction volume has little or no chance of resuming its climb for a year or more in the future.

To get a cross check on this timing he has measured the duration of eight previous major movements. This averaged 2 years 4 months.

Marked by trend line penetrations these are:

Uptrend starts	Duration	Downtrend starts	Duration
1st quarter, 1934	2 yr, 3 mo	4th quarter, 1936	1 yr, 9 mo
4th quarter, 1938	3 yr then surge 1 yr, 3 mo	1st quarter, 1943	2 yr
1st quarter, 1945	2 yr	1st quarter, 1947	1 yr, 9 mo hesitation
1st quarter, 1949 resumption of uptrend assured	2 yr, 9 mo	4th quarter, 1951 downtrend confirmed	2 yr topping out
Average duration	**2 yr, 10 mo**		**1 yr, 10 mo**

Duration of downtrends has thus been much shorter than uptrends.

• Another check—To get still another look, the wide, erratic swings of the basic index have been further smoothed out in the second chart, which shows the results of 36-month moving averages, plotted as before for the 12-month moving averages.

Now note how the basic index lines cross the moving average curve when a reversal of trend is imminent. In the current movement, note how such a partial crossing began as early as the fourth quarter of 1951, but did not break all the way through until the third quarter of 1953.

This is an additional confirmation of the warnings given by the long-range trend penetration. In Mr. Petit's opinion, "The only conclusion that can be drawn from the present technical evidence is that the peak of the 8-year movement has been reached and that a decline is underway. It would seem prudent to plan on this probability at this time."

As to the expected duration of the declining phase he says, "The characteristics of the action of the construction volume curve point to a decline lasting 2 to 3 years. The extent of the downward movement, of course, cannot be predetermined. This is because the principle upon which this method is based is one of recognition of a major reversal when it takes place. A normal expectation would be a drop to the 250 level in the ENR Volume Index, possibly by December, 1954."

How this "ex-inflation" modifies the construction outlook is shown in these direct comparisons with the current-dollar outlook:

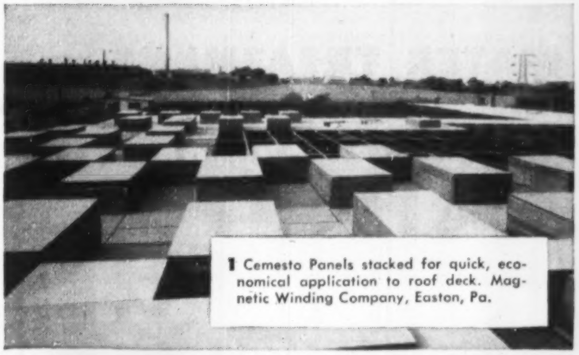
In 1952, heavy construction in current dollars increased 15% over 1951 volume. Measured by constant dollars or index it increased only 11.5%.

In 1953, volume in current dollars dropped 5%, but in constant dollars it dropped 10%.

With costs still rising, even though much more slowly, this dollar gap continues to widen for the 1954 estimates where a 3% drop is forecast for construction in current dollars, but a 5.6% drop is the prospect in constant dollars or index.

• Many factors—This composite, however, is made up of many parts, each with a volume movement all its own. These movements are chartered in the accompanying pages but with the differences there noted.

Cemesto® builds *insulated* roof decks *fast* and *at low cost!*



1 Cemesto Panels stacked for quick, economical application to roof deck. Magnetic Winding Company, Easton, Pa.

2 Caulking joints between Cemesto Panels. Smooth surface makes ideal roofing base. Carolina Asbestos Co., Marshville, N. C.

3 Cemesto Panel deck weather-stripped. All panel edges weather-sealed at factory. Magnetic Winding Co., Easton, Pa.

4 Roof deck of Cemesto Panels mopped for application of asphalt roll roofing. Pittsfield Twp. School, Washtenaw Co., Mich.

Cemesto, World's Most Versatile Building Material, combines amazing structural strength, high insulation value, interior and exterior finish—all in a single fire-resistant panel that's quick and easy to apply!

* * *

No other building material gives you all the advantages of Cemesto Insulating Structural Panels for fast, low cost construction of roof decks, as well as curtain walls and partitions. For no other combines all the remarkable properties of this modern building material.

Strong, rigid, pre-formed Cemesto Panels are made of Celotex cane fibre insulation to which cement-asbestos facing is bonded on both sides by a highly vapor-resistant adhesive. They are lighter than most building materials, yet have the structural strength to carry the roof load with a high margin of safety. And their cane fibre core is protected against dry rot and termite attack by the exclusive patented Ferox® Process.

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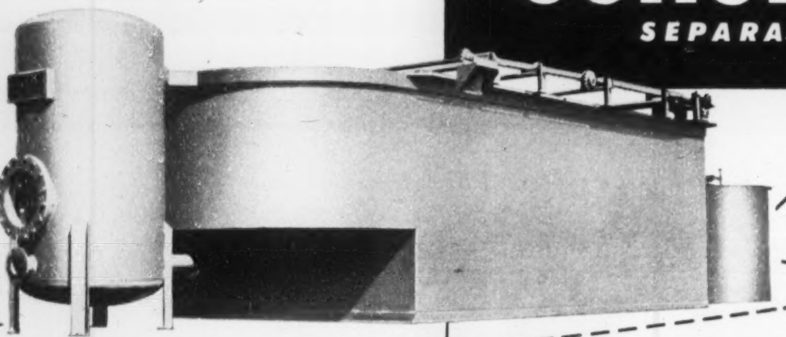

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CONSTRUCTION TRENDS

. . . . by sources of funds

In view of the role for construction that President Eisenhower's economic advisors, Arthur F. Burns and Gabriel S. Hauge have reserved as an antidote for recessions, the most startling fact that emerges from this analysis of trends in construction volume is the consistency with which federal financing and policies have been responsible for the erratic ups and downs of heavy construction volume.

How federally financed construction itself varies is shown by the defense plant peak in World War II and the atomic energy plant peak in 1950-52 in the federal curve at the bottom of the chart.

Conversely, federal controls were a principal cause of the dip in private construction in 1951-52.

Note also that state and municipal work hesitated during this same controls period before resuming its rise.

These curves are plotted and interpreted according to the rules shown below.

DIFFERENCES FROM PRECEDING INDEX ANALYSIS

In the preceding section of this trends study you will find the total composite of all types of heavy construction. In this section are the trends peculiar to construction's more or less homogeneous parts.

Here, for the parts, you get construction dollars just as they are, still shrinking (a little) in their buying power but, for better or worse, these charts are based on current dollars. There, for the whole, we eliminated all effects of inflation by taking out the cost rise to get constant dollars. We even went further than that and took out the constant dollars to get an index of physical volume.

There a semi-log scale is used to show rate of changes in trends. Here you have straight rectilinear charts which show the amount of change in construction volume.

RULES FOR PETIT TREND ANALYSIS

• BASIC DATA (the thin vertical lines) are plotted by connecting the highest monthly volume of contract awards each quarter with the lowest.

• THE BLACK BLOCKS are essentially the same except that they connect the high-low of the 12-month moving averages. Blocks show the strength of the movement.

Basic data lines show the extreme erratic ups and downs of the volume of new work coming into the market from month to month, whereas 12-month moving averages smooth these out and show the pattern of the underlying volume movement.

• TREND LINES are applied to the upper righthand corners of the blocks on a down movement. On an up movement they connect the lower righthand corners. They show direction and its rate of change.

• THE GAPS that open up between blocks show the momentum. The breakaway gap confirms the start of a major movement.

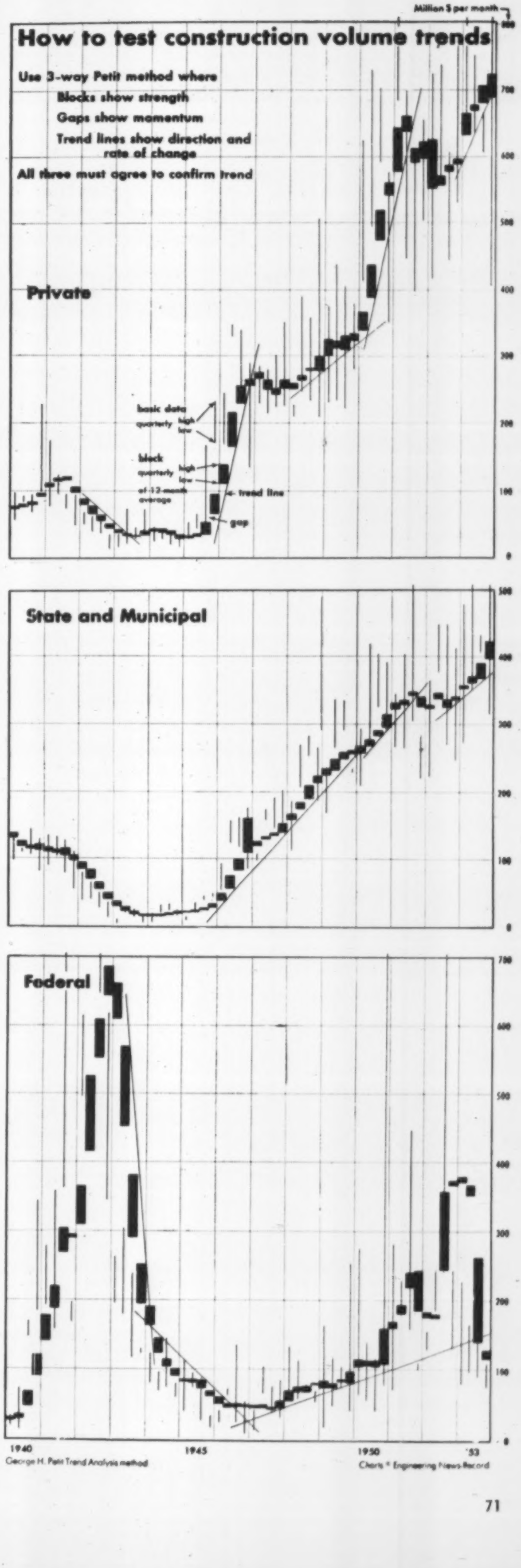
When a block penetrates a trend line, that indicates the termination of a major movement.

Blocks expand as a new movement gets underway and gains strength, they shrink as it ends.

Gaps open up as its momentum increases, close as it wakens.

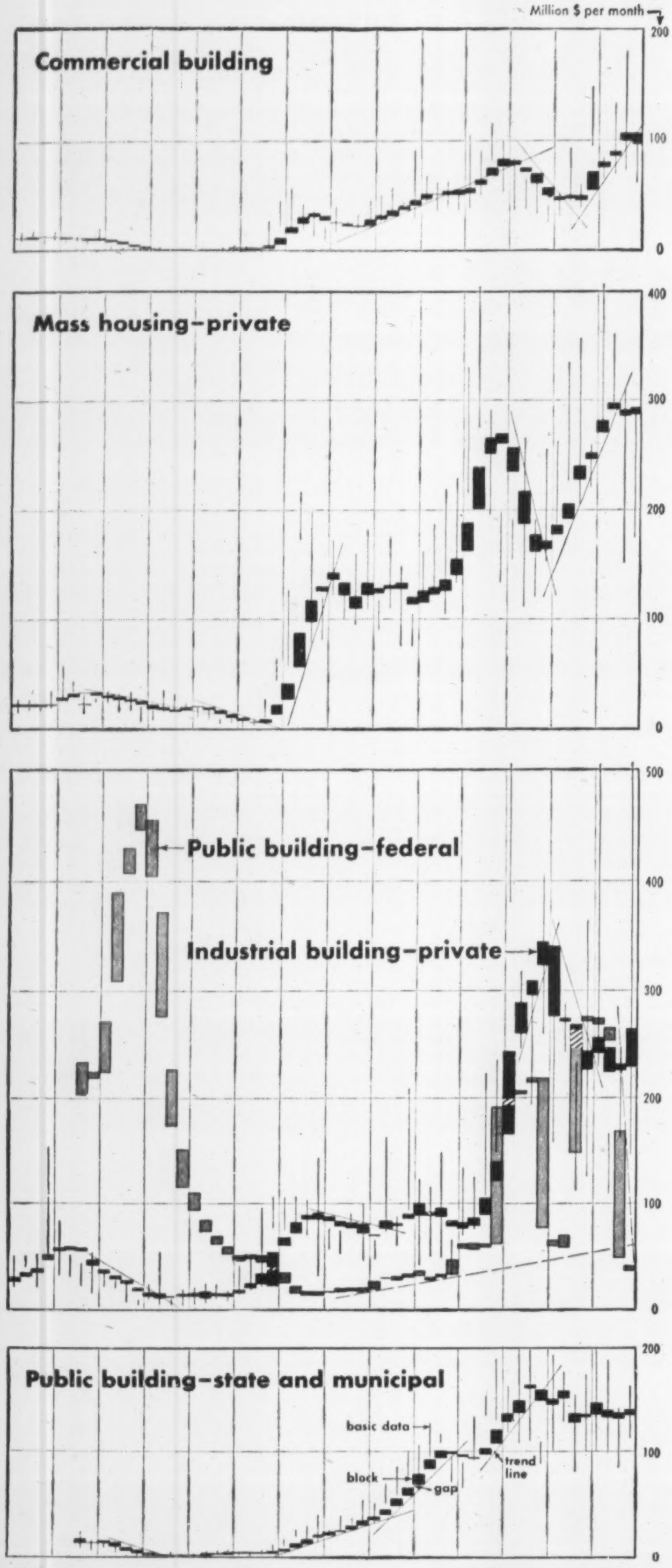
• ALL THREE, SHRINKING BLOCKS, CLOSING GAPS, TREND LINE PENETRATIONS must work together or agree to confirm the end of a major movement.

The basic data lines lead the 12-month moving averages. When the basic data lines are above the blocks-curve, volume is still rising. When the basic data lines cross the block curve the movement is ending. When they are below, a down trend has started or is in effect.



George H. Petit Trend Analysis method

Charts © Engineering News-Record



George H. Petit Trend Analysis method

Charts © Engineering News-Record

CONSTRUCTION TRENDS

. . . by types of work

• **Commercial building** is in a strong up movement, although the last quarter volume dampened it some. It could be topping out, so it bears close watching. Note that the basic data line has crossed the moving average, the gap disappeared and the trend line penetrated the 4th quarter block. A new trend direction is at hand, but whether it will be a temporary pause, a sidewise movement, or a reversal is not yet evident. The next two quarters should help to establish the new trend.

• **Mass housing privately financed** recovered from the effects of controls in a strong 1952-53 uptrend with widening gaps. But this has topped out, at least temporarily. The trend line was penetrated in the second quarter and basic data lines have crossed the moving average curve. However, no gaps have opened up so the direction of the new movement is not yet clear. It could continue sidewise at the high rate shown. The situation bears watching.

• **Industrial building privately financed** obviously topped out in 1951 and reversed into a downtrend. But its 1953 moving average blocks have been penetrated by the downtrend line so the down movement has stopped and held around $240 million per month. No clear indication is present of a further downtrend, no new trend line has as yet been set. Here, too, the contracts awarded in the next two quarters may help to establish the direction of the next major volume movement.

• **Federally financed industrial building** included defense plants during World War II and atomic energy plans in 1950-52. This class of construction is largely responsible both for the super construction boom and for the falling back to just a king size boom.

• **State and municipal public building,** surprisingly, shows a slight downtrend. This is due largely to the big decline in public housing.

• **Waterworks** construction bumps along at its high rate, just below $20 million a month, with all indicators pointing to a continuation of this sidewise movement.

• **Sewerage** contracts in 1953 resumed their strong uptrend after a short hesitation in 1952. The fourth quarter block in 1953 and the small gap could indicate the start of a new, steeper uptrend. This block rises above both the short, '52-'53 trend and the long-range, '48-'53 trend.

• **Earthwork, irrigation, waterways** takes us back to the federal pattern again, since such a high percentage of this class of construction has been federally financed. That means that the trend is down, complete with big gaps, large blocks, and basic data lines that are pre-dominantly below the moving average blocks. However, the last two blocks are smaller and the 1954 blocks, as they come along, could penetrate the trend line to indicate that this downtrend is ending. Watch for further evidence of the termination of this down movement.

• **Highway** construction keeps lifting its uptrend lines up to steeper rates. The pauses to date have proved to be staging areas for even stronger up movements. Note the high-summer, low-winter pattern of the basic data lines which was broken in the 1953 fourth quarter to show the strongest up block to date.

• **Bridges,** like highways, show a strong uptrend in volume—the strongest, in fact, of any class of construction studied. The blocks have pulled up above both the short range and the long range trend lines. In addition, the basic data lines are predominently on the top of the moving average curve.

• **Conclusions.** Strong volume uptrends thus are in progress for bridges, streets and roads, sewerage.

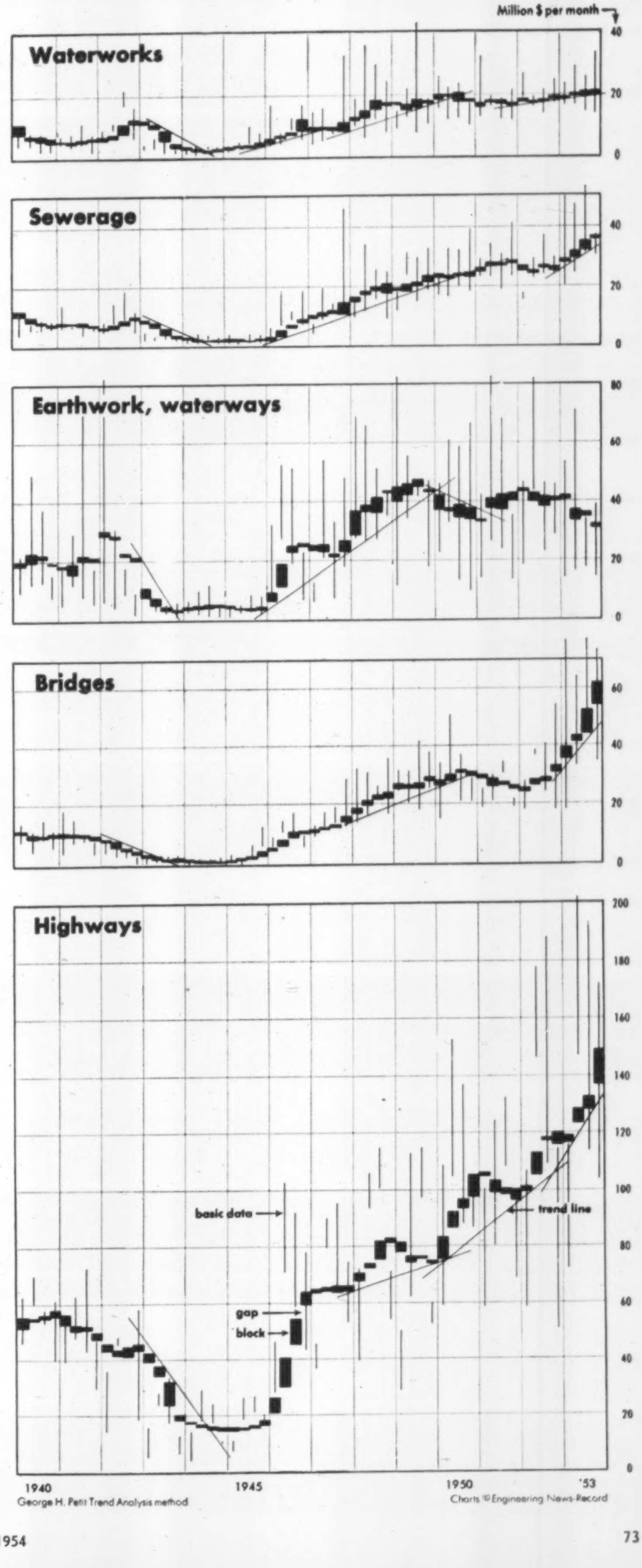
Sidewise, still indecisive, movements at high levels are in effect for commercial buildings, private mass housing and waterworks. Industrial building is in this sidewise group, too, at high, though not at the record, altitude occupied by the other groups.

Strong downtrends are evident for federal plant construction (AEC) and for earthwork, irrigation and waterways, though both down movements could end soon.

The mild downtrend in state and municipal buildings is petering out and could show a reversal before the end of the year.

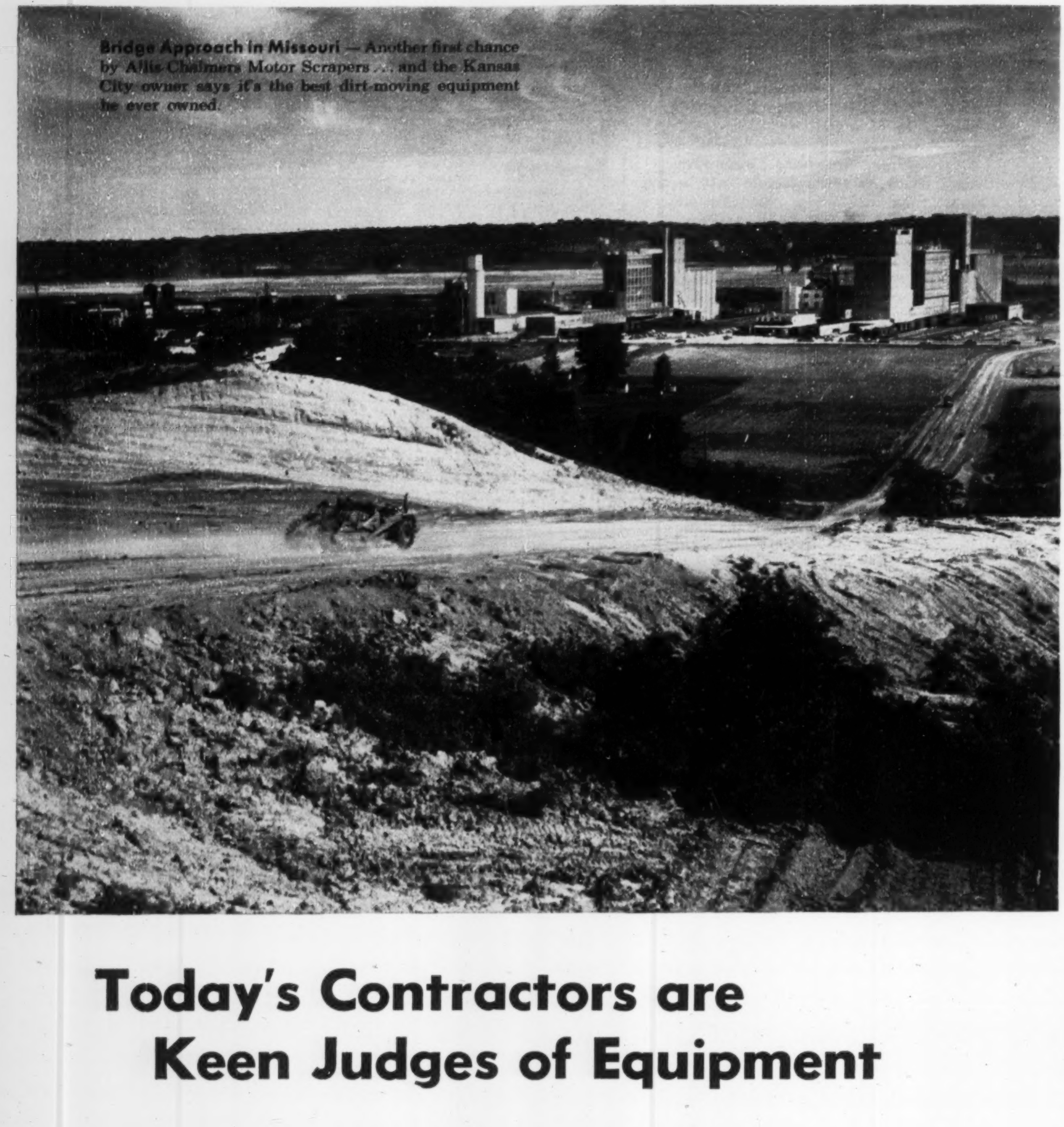
Thus, the construction parts, by and large, look even livelier than the construction whole—all except federal. And federal construction can be put into (or taken out of) action faster than any other.

There can be no doubt about 1954 being a king size construction year.



George H. Petit Trend Analysis method

Charts © Engineering News-Record



Bridge Approach in Missouri — Another first chance by Allis-Chalmers Motor Scrapers . . . and the Kansas City owner says it's the best dirt-moving equipment he ever owned.

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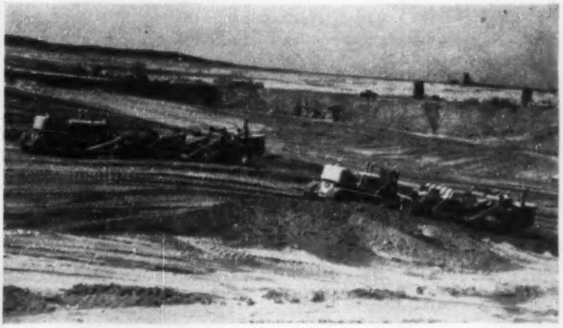
If you have your sights set on some close-margin, hard-to-get business, we *know* it will pay you to go over *all* the facts with your nearby Allis-Chalmers dealer.



Housing Project in California — Here, six big TS-300's and their HD-20 partners team up at the Westlake job near San Francisco . . . for a contractor moving over 8,000,000 yards in the last five years.

Runway Extension in Tennessee — This TS-300 is the first Allis-Chalmers equipment this contractor has ever owned, but it earned a regular spot fast by high-balling capacity loads like this trip after trip.

Dam-Building in Illinois — and the fleet color is Persian Orange. The 176 hp. TS-200's and HD-20's load smoothly, efficiently . . . and the TS-200 is rolling fast toward the fill the instant they break contact.

Railroad Bed in Montana — These TS-300's (14-yd. struck capacity; 18-yd. heaped capacity) averaged 14 trips an hour, excavating grade for a five-track rail bed at the site of a new aluminum plant.

Jet Base in Jersey — Silt and sand make this a tough job . . . but the extra power of the TS-300's, plus the HD-20's ability to exert full power at creep speeds, paid off in big yardage.

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How big is construction?

SINCE WORLD WAR II, it has turned out $200 billion worth of work, plus about $78 billion in maintenance and repairs.

It has put up more than 8 million homes, built 300,000 mi of highways, and constructed $49 billion worth of business facilities.

It has used over 215 billion bd ft of lumber, about 17.7 million tons of fabricated structural steel, and almost 1.8 billion barrels of cement and vast quantities of other materials.

LAST YEAR, it absorbed for new construction, maintenance and repair a sum equal to more than 15% of all sales by U. S. manufacturing corporations.

It accounted for 12.6% of all goods and services produced in the U. S.

It directly employed about 4.4 million people—more than 7% of the labor force—and kept several million other workers busy supplying it with materials and equipment.

Everybody's business

The construction industry is like nothing else in the U.S. economy. True, agriculture and the textile trade also supply products which human beings must have in order to survive. But the character of construction is even more basic, for its products are essential to the functioning of all industries. Indeed, so universal is the need for construction that, in addition to the organized construction industry, nearly every business firm and public institution has some sort of construction force of its own, even if rudimentary. And that's why, even in this specialized age, a good many individuals occasionally have done some construction for themselves.

Construction is also varied: It reaches from drafting boards in a metropolitan skyscraper to distant jungles and deserts; from tunnels under a river to catwalks in the sky; from the expensive, fateful structure of an atomic reactor to a four-room house in a suburban development where a young couple with their first baby have just moved in. It ranges from work that can be done with a clawhammer to that which requires the services of mechanical giants; from structures the plans for which can be sketched on the back of an envelope to those where design can be shown only by hundreds of pounds of blueprints.

Finally, because construction is basic and so varied, it is big—and getting bigger. It grows as the U.S. population grows, and as desires for new standards of living become demands. It gets bigger with the development of industry, research, commerce, transportation, and with the needs of government.

That is why the construction industry—measured from many different angles—is one of the biggest in the U.S. today. It is the purpose of this article to show how much construction has grown in recent years, how big it is now compared with other major industries, and its future.

In terms of dollar value of new construction alone, this industry is not quite the largest in the U.S. Dollar volume of new construction runs below sales of the food industry, although in 1953 it passed total cash receipts of farmers. But if the government estimates on maintenance and repair are added to figures on new construction, the industry is by far the largest.

The charts on the opposite page show new construction only. They compare construction with sales of processors of primary metals, notably iron and steel; and with sales of fabricated metals. They show how construction compares with sales of the auto and truck industry, with its equipment suppliers thrown in for good measure. They show how construction compares with the industries that make the machinery with which our economy turns out goods; and how much bigger it is than sales of the big oil and chemical industries. And you also can see from the charts that dollar volume of construction in place is well ahead of sales of the textile mills and the clothing manufacturers.

These charts make quite plain the almost uninterrupted rise in construction's dollar volume during the last few years. Back in 1948, monthly sales of motor vehicles and equipment were running ahead of construction, but now construction has pulled ahead and maintained its lead. While most of the other industries whose sales are charted on the opposite page have also increased sales over the last five years, none of them presents any serious challenge to construction's dominance.

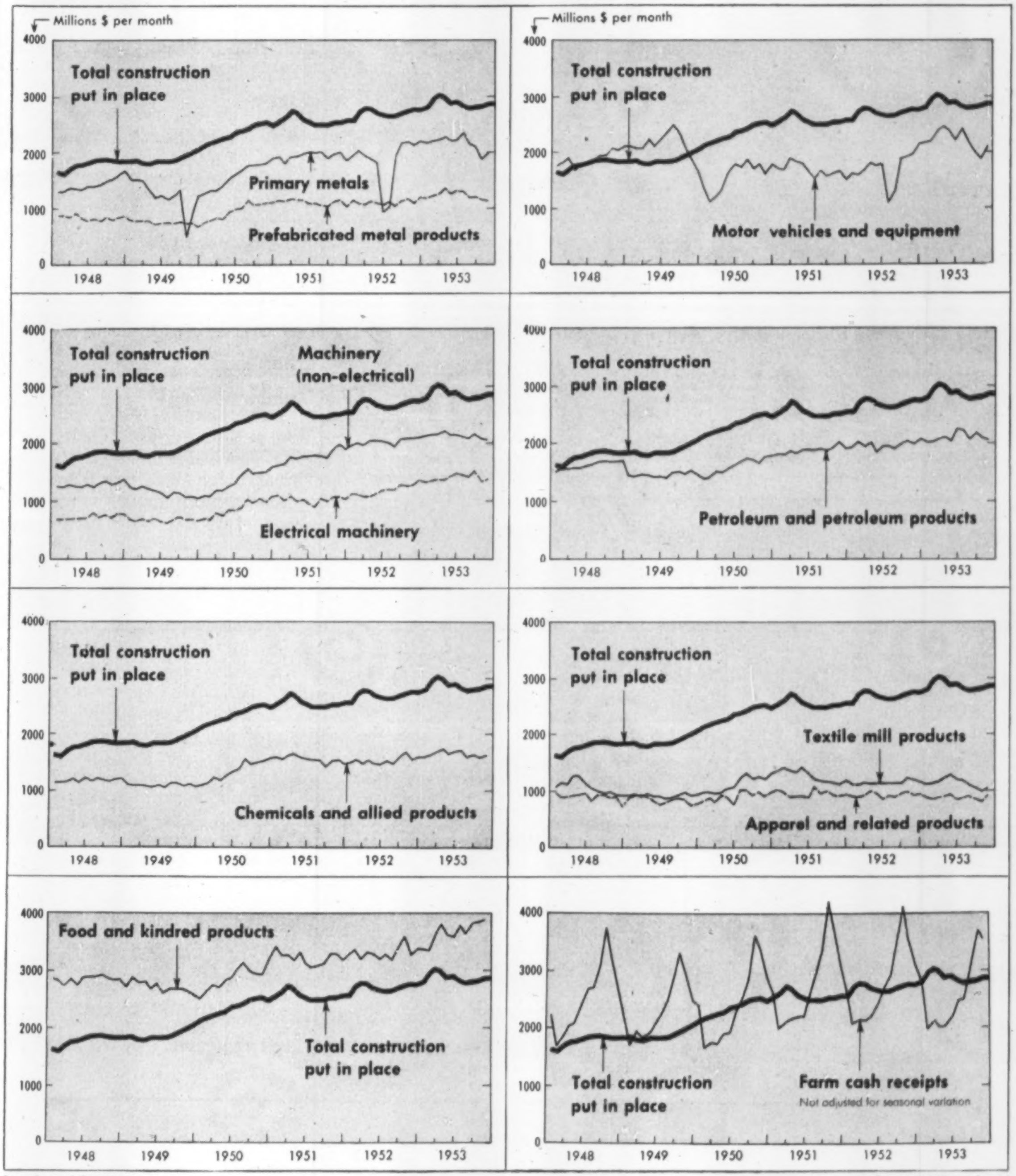
• **Why it's so big**—There is a good reason for this leading position:

Other industries cannot function without structures to keep their equipment and workers out of the weather, or without roads, railways, bridges, pipelines and waterways to bring in their raw materials and take away their finished products. People would have a hard time living in present day society without the houses, retail stores, offices, schools and hospitals which construction provides.

Put next to this fundamental fact about the construction industry two others: (1) Because it is the servant of the entire economy, anything that affects that economy affects it. (2) Because its products are long-lasting, the facilities it creates in any one year will be only a small addition, percentagewise, to the total existing "stock" of completed and usable construction. In other words, construction is volatile. A slight change in the need for the total "stock" in any big category of construction means a big change in the volume of new and projected construction in that particular category.

Compare the way construction has grown in peacetime since 1920 with the coincident growth of total value

How construction compares with other industries



Data Dept of Commerce

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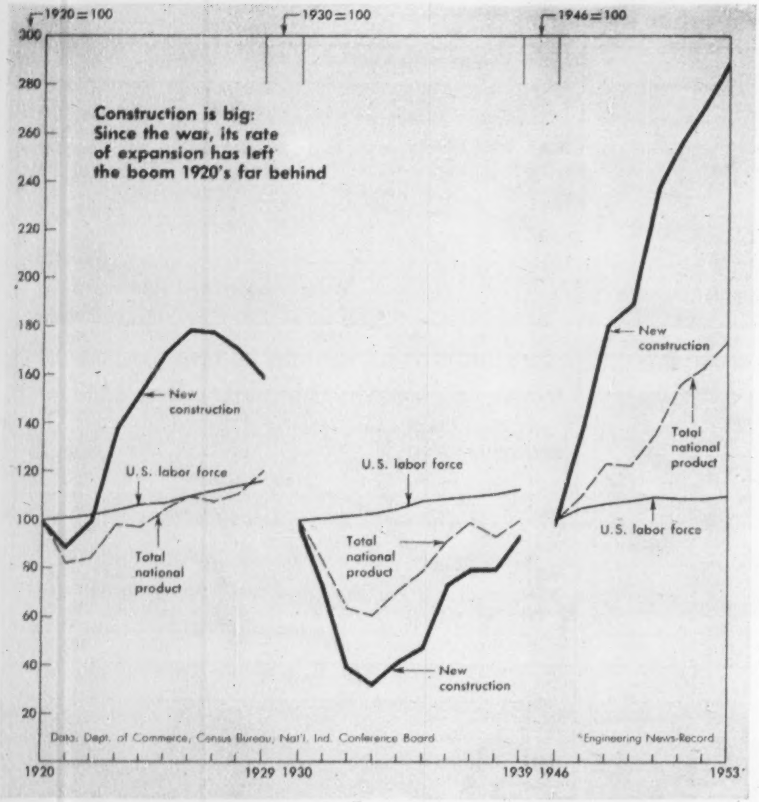
of goods and services produced in the U. S. (chart, page 78). During the 1920's, dollar value of construction put in place increased much faster than total goods and services (that is, what the economists call "gross national product"). However, when construction started downward in 1927, its total volume remained much farther above the 1920 level than did total national product.

During the 1930's, construction had a few tough years. For a while, it declined faster than total national product. Then it gained faster. Since World War II, construction has run away with the show. In 1953, dollar volume of construction put in place was almost triple what it had been in 1946, when the postwar expansion program was just getting under way. By comparison, total national product has increased only about 75%.

Suppose construction is considered in terms of a constant dollar. That takes out the inflation factor and shows how actual physical volume varies in different years (chart, page 82). Even in these terms, volume put in place during the period since World War II marks a considerable increase over the 1920's.

This increase, however, is entirely due to the enormous rise in public construction. Volume of private construction has still not quite reached the high level it attained in 1926. The reason is that residential construction

(Continued on page 78)



Construction is big: Since the war, its rate of expansion has left the boom 1920's far behind

Data: Dept. of Commerce, Census Bureau, Nat'l. Ind. Conference Board

*Engineering News-Record

—in terms of a constant dollar—has been lower in the post World War II period than it was in the 1920's. The same is true of commercial construction.

This is a measure of the relative restraint of our post World War II boom. In the 1920's, though fewer housing units were built, they were much more lavish. The U. S. has built few big hotels since the 1920's, for instance, and not very many swank apartment houses or big mansions. After allowing for inflation, there also has been much less construction in the field of office buildings, warehouses and stores during the post World War II era.

• **The big question**—This review of construction's fast ups and downs during past decades suggests a question which almost any construction man over 40 has often asked himself: Will the boom-and-bust pattern of the 1920's and 1930's repeat itself in the later 1950's? In other words, how big will construction be during the next few years?

It is this deep down anxiety among businessmen in general that has attracted considerable attention in the last few months to the ideas of Colin Clark, a British economist with a reputation for accurate forecasting. Practically alone among his colleagues in the U. S. and Great Britain, Clark believes that this country may be in for a serious depression. For instance, he sees signs of a sharp drop in industrial and commercial construction.

Clark's ideas are taken in detail in the Business & Finance section. It is sufficient to say here that ENR believes he is much too pessimistic in his predictions.

It is quite possible that construction may not continue through the 1950's at the same level it reached in the first few years of the decade. There is, of course, no lack of needs and projects for new construction (see ENR's backlog, page 55). This is apparent particularly in the fields of slum clearance, new housing, highways, parking facilities, schools, and hospitals. But in large part these things must be financed by the American people's long-term savings and by the taxpayer. It is conceivable that volume of new savings, which last year rolled up a record total of $15 billion, might decline somewhat. Also, obvi-

(*Continued on page 81*)

How big is construction?

Big enough to employ many kinds of skills, and many thousands of people. Here are the latest Census Bureau figures (1950).

Professional	
Architects	25,000
Civil engineers	125,568
Surveyors	26,229
Elec. engineers	108,137
Mech. engineers	112,664
Indus. engineers	40,895
Chem. engineers	33,072
Mining & met. engineers	22,481
Designers	40,108
Draftsmen	124,749
Proprietors	
Construction	291,251
Lumber, bldg. mat. dealers	129,102
Real estate agts., brokers	142,564
Props., mgrs., real estate	114,448
Mgrs., supts., building	66,620
Building Trades Workers	
Carpenters	982,241
Electricians	324,046
Constr. foremen	60,439
Constr. inspectors	8,272
Masons	175,828
Painters, constr. & maint.	431,109
Paperhangers	22,536
Glaziers	10,665
Plasterers	64,351
Cement & conc. finishers	32,653
Plumbers & pipefitters	295,990
Roofers & slaters	48,528
Stationary engineers	218,146
Cranemen, hoistmen, etc.	106,864
Struct., orn. iron wkrs.	55,133
Apprentices	
a. carpenters	10,753
b. electricians	9,194
c. plumbers	12,373
d. bldg. trade	4,254
Cement, conc., gypsum	29,419
Struct. clay products	22,067
"Operatives"	69,233
Laborers	752,847

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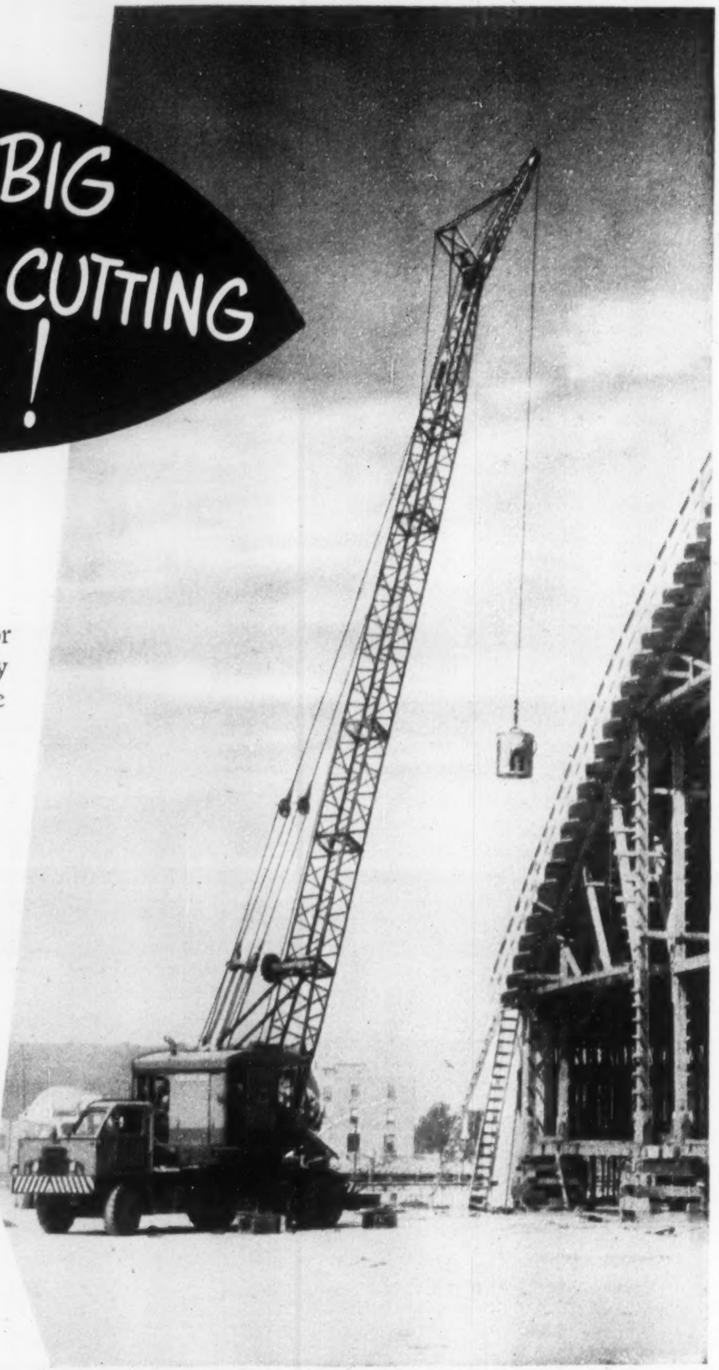

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ously there is a limit somewhere to how high taxes can go.

• **The crucial difference**—However, this does not mean boom is going to turn into bust. Study of the charts in this article will show an essential difference between the boom of the 1920's and that of the 1950's. During the 1920's, construction rose for a time to a higher percentage of gross national product than it has ever reached since (chart, page 82). Then—a couple of years before the stock market bubble reached its full size and burst in 1929—construction activity turned down. This pattern is visible from three different angles—not only as a percent of national product, but in terms of dollar volume and of physical volume.

So far in the 1950's, construction as a percentage of national product has shown no signs of any sharp decline. After a final upsurge in 1950—the record year for housing starts—it has leveled off with a slight upward tilt. In 1953, the ratio of construction to GNP even rose slightly over 1951 and 1952.

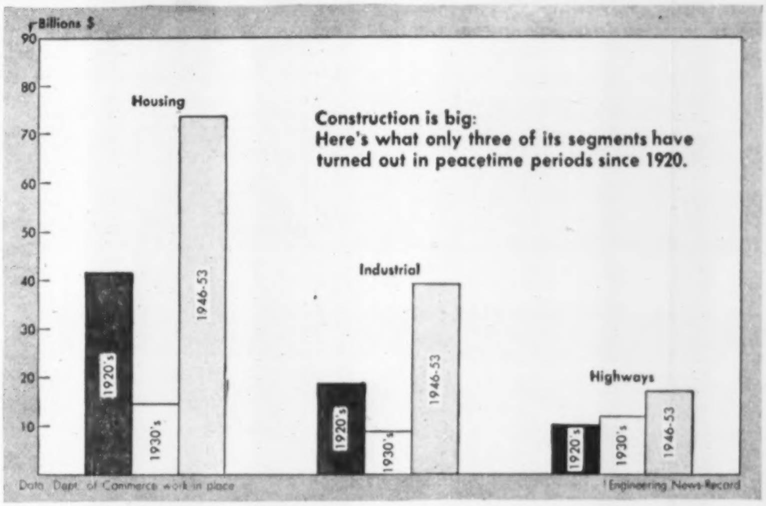
In other words, there is no tendency for business, government and individual home buyers to cut back much on construction spending, though the U. S. economy reached an alltime peak in business activity last year. Any moderate cutbacks in home building and business construction in 1954 will be offset almost entirely, if not completely, by an expected increase in spending by states and local governments, encouraged by what probably will be fairly easy rates in the capital market.

Furthermore, very few people today see any speculative bubble in our economy now as there was in the late 1920's. Prices in many fields have been going down for many months, without uncovering any major airpockets.

• **Housing**—A few people think they see such a bubble in the residential housing field. According to their line of reasoning, the bubble will be uncovered when a large number of owners of small houses try to sell them in order to buy larger ones, and then find they can't get out their full equity.

Such predictions of a sharp decline in demand for new houses (with an accompanying drop in prices of existing homes) are based on the Census Bureau's forecast of a sharp decline in formation of new families between now and 1960 (chart, page 84). This prediction develops from two facts: (1) A very high proportion of persons in the marriageable ages are married already. (2) The number of

(*Continued on page 82*)



Construction is big:
Here's what only three of its segments have turned out in peacetime periods since 1920.

Data: Dept. of Commerce work in place

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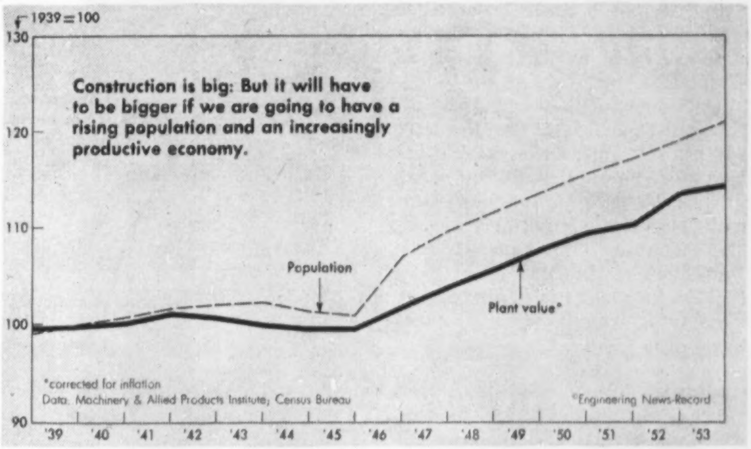

Construction is big: But it will have to be bigger if we are going to have a rising population and an increasingly productive economy.

*corrected for inflation

Data: Machinery & Allied Products Institute; Census Bureau

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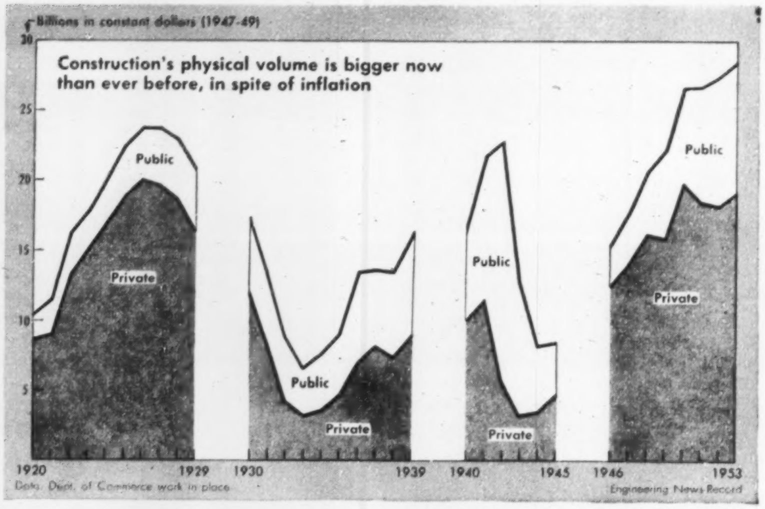
How big is construction?

It includes about one-quarter million contracting firms, large and small, as shown by the last government count (first quarter of 1951).

Number of Employees	General Contractors Construction	General Contractors Building	Trade Contractors
0 to 3	5,618	34,553	91,568
4 to 7	3,353	19,131	35,990
8 to 19	3,341	12,448	20,490
20 to 49	2,197	4,995	7,109
50 to 99	1,039	1,706	1,733
100 to 249	653	920	644
250 to 499	180	224	80
500 or more	72	100	26
All	16,453	74,077	157,640

Based on Social Security tax reports

Data: Dept. of Health, Education & Welfare; Dept. of Commerce



Data: Dept. of Commerce work in place

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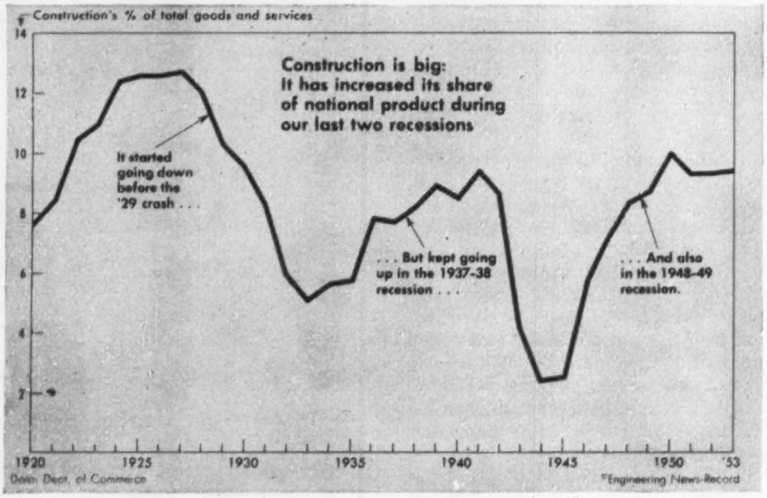

Data: Dept. of Commerce

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Americans now reaching their early 20's is relatively small, because of the low birth rate in the depression years.

This pessimistic forecast neglects the additional fact that a sizable proportion of our existing housing units are below minimum housing standards. Assuming that owners are able to finance it, there should be a large volume of remodeling, enlarging and replacement building to make up for a drop in new families requiring homes.

Furthermore, the decline in new families who need housing units should be offset partly by the fact that people are living longer. Hence older married couples—and widows and widowers—can be expected to maintain households longer than in past decades. Personal incomes will remain high enough during the rest of the 1950's so that a great many older people (many of whom may be retired) will be able to afford separate housing.

Furthermore, because personal income will stay high during the later 1950's, there will be considerable demand for housing units by what statisticians call "incomplete families." These include not only widows and widowers, but unmarried or divorced adults. In 1950, about 23% of all dwelling units in nonfarm areas of the U. S. were occupied by these "incomplete families."

• **Industrial construction**—How big will other segments of construction be during the later 1950's? Some slackening is possible, of course. But there is small basis for the notion that, in a postwar frenzy, we have overbuilt our industrial plant and need a long breathing space.

The huge annual capital expenditures of between $20 billion and $30 billion in recent years hide the fact that a very large proportion of such spending went to replace used-up plant and equipment. A recent study by the National Association of Manufacturers concludes that only about 20% of business capital spending results in net expansion.

This point comes as a surprise to most people, but it is based on the fact that during the postwar inflation allowances made by business firms for depreciation have been considerably less than the actual cost of replacing worn-out fixed assets. Depreciation is made on the basis of original cost, but during an inflationary period replacement cost jumps far ahead.

Look at the chart on page 81. It shows that since World War II our physical plant inventory (based on estimates by the Machinery & Allied Products Institute) has grown at approximately the same rate as population, no faster. This indicates we have not overbuilt our industrial plant. For the rest of the 1950's, we shall have a tremendous volume of construction business in modernizing or replacing older plants, even if most businessmen should decide not to expand any further for a while.

In any event, this country has by no means built all the factories it will need to meet future demand. Ours is not a "mature economy", as it was the fashion to say in the 1930's, but a young one, on the verge of a period of great growth.

Last month, at a time when auto dealers were complaining very audibly that they could not sell all the cars that Detroit plans to ship them this year, General Motors Corp. announced it was planning to spend at least a billion dollars for expansion in 1954 and 1955 (ENR Jan. 28, p. 100). By comparison, GM had spent $2 billion for fixed assets during the whole eight-year period since start of 1946.

GM's announcement had nothing to do with its estimates of the 1954 car market. Not many of the facilities the $1 billion will pay for can get into production this year. The move was rather an expression of confidence in the long-term rise of the American standard of living.

To quote the carefully-chosen words of GM's canny board chairman, Alfred P. Sloan: "We don't think this additional capacity is going to be needed at any certain time in the future. Nobody knows when it will be needed. But we have confidence it is going to be needed some time, and we have greater confidence it is going to be needed a lot sooner than many now think."

Pessimists could point out that GM is a huge corporation with enormous resources, able to take the long view. Smaller companies might have more trouble with long-term plans for construction and equipment, and much

(*Continued on page* 84)

"17 floors in 13 days and here's how we did it!"

says H. A. Padgett, Jr., partner
in BMFP Construction Co.
Lubbock, Texas

Great Plains Life Insurance Company Building
Architect-Engineer: David S. Castle Company, Abilene, Texas

Describing the important function of Cofar—combined form and reinforcement—in constructing the Great Plains Life Insurance Company building, Mr. Padgett says, "We started concrete floor work on Monday, September 7. After seven working days we had completed 7 floors and in the next 6 days, 9 more floors and the roof. The schedule shows 17 floors completed in 13 working days. We couldn't possibly have done the job that fast without Cofar!"

Cofar deep-corrugated steel units (with transverse temperature wires welded across the corrugations) perform the dual job of reinforcing and forming concrete slabs. Cofar eliminates the need for wood forms, saves weeks in building time, speeds occupancy. For more information, estimates or costs on *your* building project, contact home or district offices, attention Dept.ER-A.

see our catalog in
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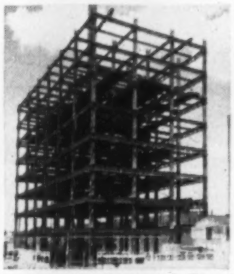
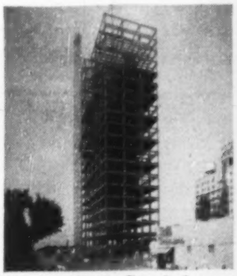
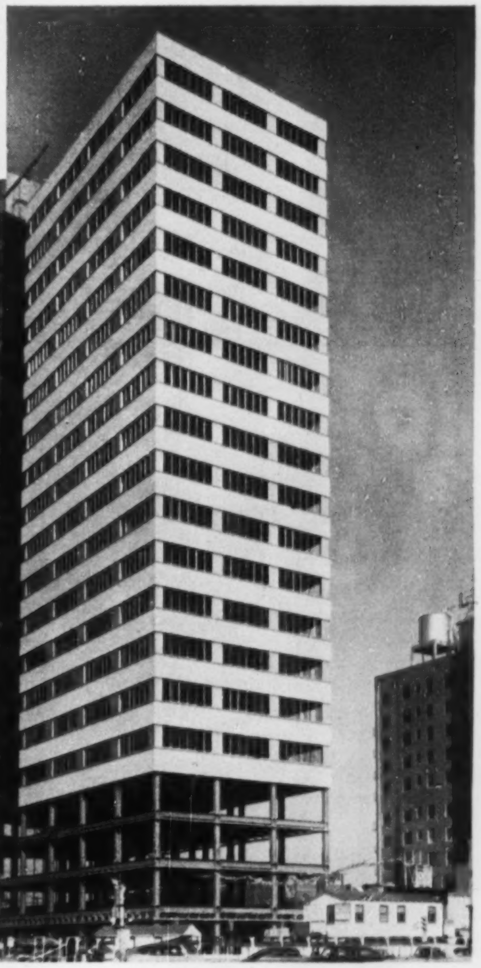


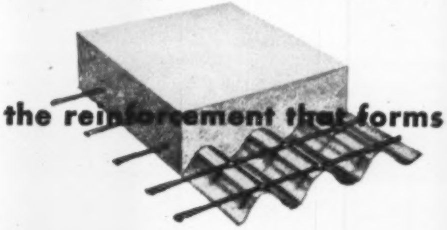
June 29 photo of Great Plains Life Insurance Co. Building shows partial erection of structural steel. Cofar placing followed *immediately.* Cofar units weigh only 2 lbs. per sq. ft., are bundled for individual bays, arrive at job site cut to fit building frame.



August 24. Steel framework completed! Note that Cofar has already been placed on 13 floors providing a safe, unobstructed working platform for construction activities. Trades move in, complete their work without delaying concrete operations.



December 7. Outside work virtually completed! Concrete floors in place more than two months! By using Cofar units which serve as tight, incombustible forms for wet concrete, BMFP Construction Company avoided the use of wood forms, eliminated the placing, detailing and tieing of long, straight and bent rebars. Adds Contractor Padgett, "The typical Cofar span was about 10′ . . . a very simple, economical operation!" Result: a safe, high-strength floor. And Cofar is equally suited to steel or concrete frame construction, requires no special procedure.



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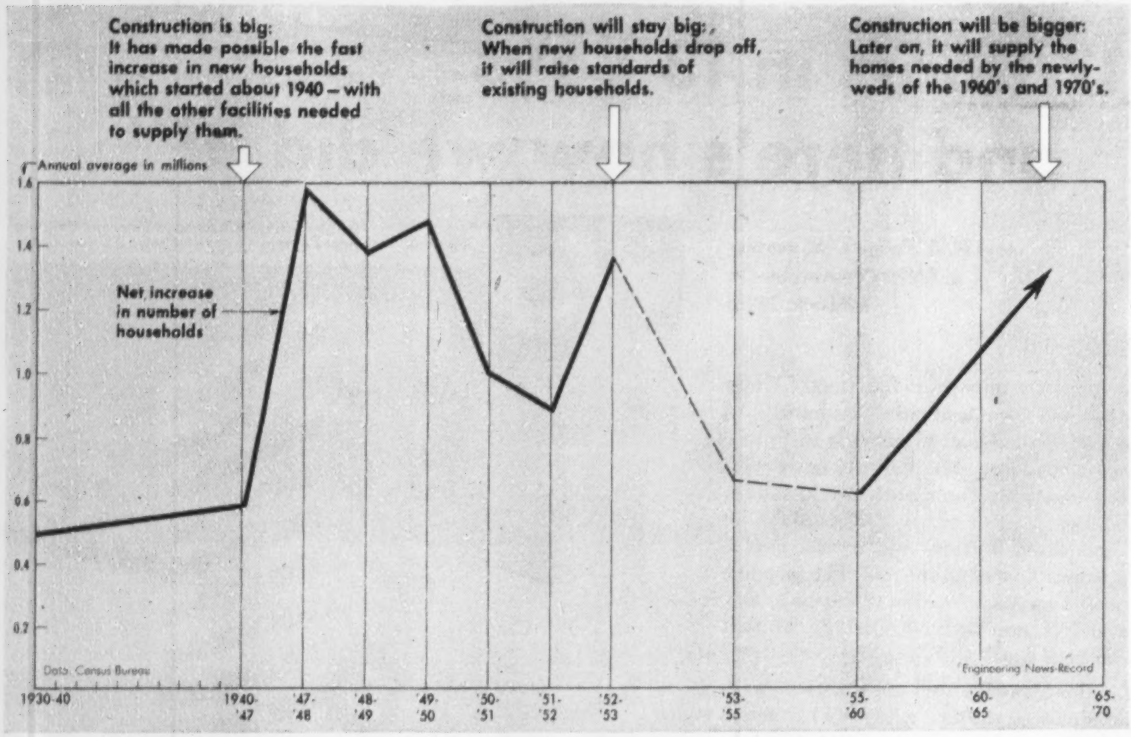

more financial strain. Yet such construction during the next few years is bound to pay off for smartly-managed smaller companies as well as the big ones.

The reason is very simple, and yet all-important. There are no people on earth like Americans. They are restless, never satisfied with the best that's available. They want new and better things, an ever-improving standard of living. What is even more important, they are accustomed to getting what they want. Research makes it possible to produce new, improved products and the American people can afford to buy them in such mass quantities that as a result the unit price of the item comes down.

There is no ceiling to buyer demand, and that is one reason why the construction industry will be kept busy most of the time for decades to come. Take just one example. By the time the radio manufacturers had sold about all the radios they could, they found they had become the electronics industry, with enormous new potentialities. TV is only the first of this industry's new developments. All of them, you can be quite sure, will involve new construction and increased activity in this industry.

• **Public construction**—There are also vast potentials for construction in the activities of the federal government and of state and local governments. The need for improvements in the existing federal-aid highway system has been estimated at \$35 billion—and that doesn't include necessary improvements on another 2¾ million mi of streets and roads which have never been added up. Also, a great deal more needs to be done to rid our rivers, harbors, and coastlines of pollution.

The problem of water and what to do with it is far-reaching, involving many billions more of potential construction over the next generation. We need to conserve our rainfall, spread out its beneficial effects and control its harmful ones. Due to the increase in per capita use of water—caused by heavier industrial and domestic consumption—the water table is declining in many parts of the U. S.

Naturally, the problem of irrigation in arid regions is always with us. But in addition to this, there are plans afoot to offset drought in areas which get sufficient but irregular rainfall, by spreading it out through supplemental irrigation facilities. This ties into the related problem of flood control and return storage on which many billions of dollars have been spent already. And it ties into this last problem, still only a potential one: The possibility that our population may outrun food supply unless food production of existing areas is improved and new areas that are not now producing are put to use.

• **What to expect**—We need not, then, expect depressed conditions in the construction industry during the late 1950's, simply because there has been a boom going on for most of the last eight years, or because the household formation trend is temporarily down. History will not repeat itself; it rarely does. There will be ups and downs in the construction industry. But many of them will offset each other. However, the long-term trend is up.

Somewhere around 1960, the economic picture will change. The baby boom which started about 1940 will begin to have an echo effect on home building and on the industries which produce the things new families buy. There should be a big increase in demand for cars, home appliances, furniture. This will increase steadily for at least a decade, creating a fresh wave of demand for plant construction, public utility construction, schools, and so on.

There is no cause for pessimism among construction men as they look into the years ahead. Construction is the basis of our expanding economy. It has always been a big industry. And big as it is now, it will continue to grow bigger.

New fields, like atomic energy, electronics, automatic factories, will get tremendous development as the Korean defense boom tapers off. Beyond that lie greater living standards than Americans have ever known—at work, in education, at play, and at home. And beyond America is a whole world in which the U. S. construction industry will have to play an increasingly important role in bringing better living standards to the peoples in other lands.

the crane with the BOARDING HOUSE REACH

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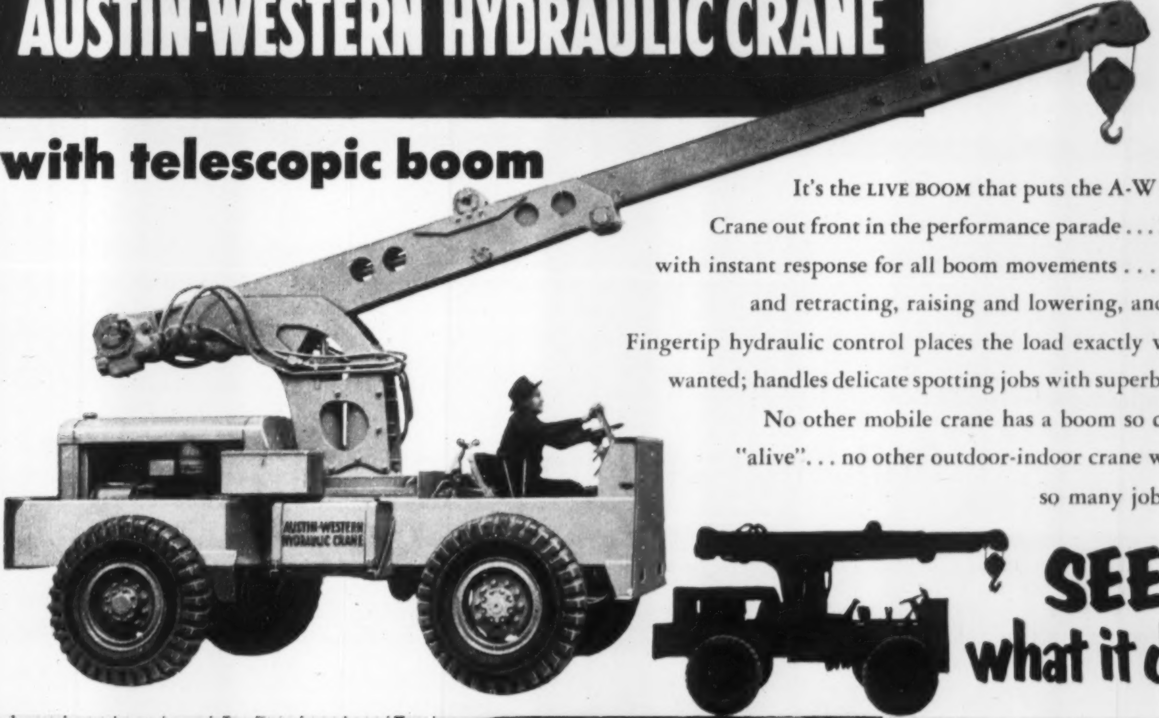
with telescopic boom



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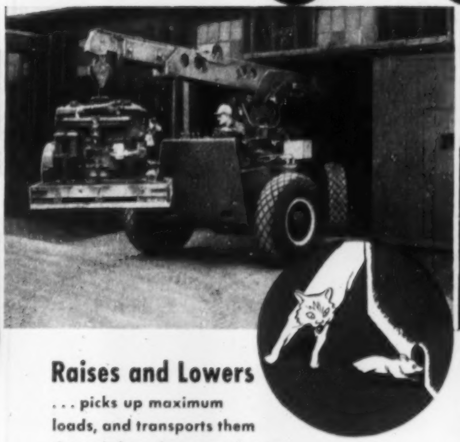

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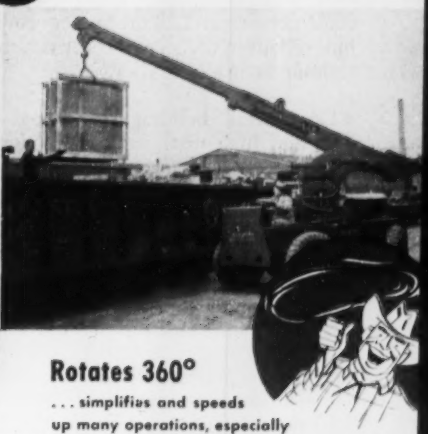

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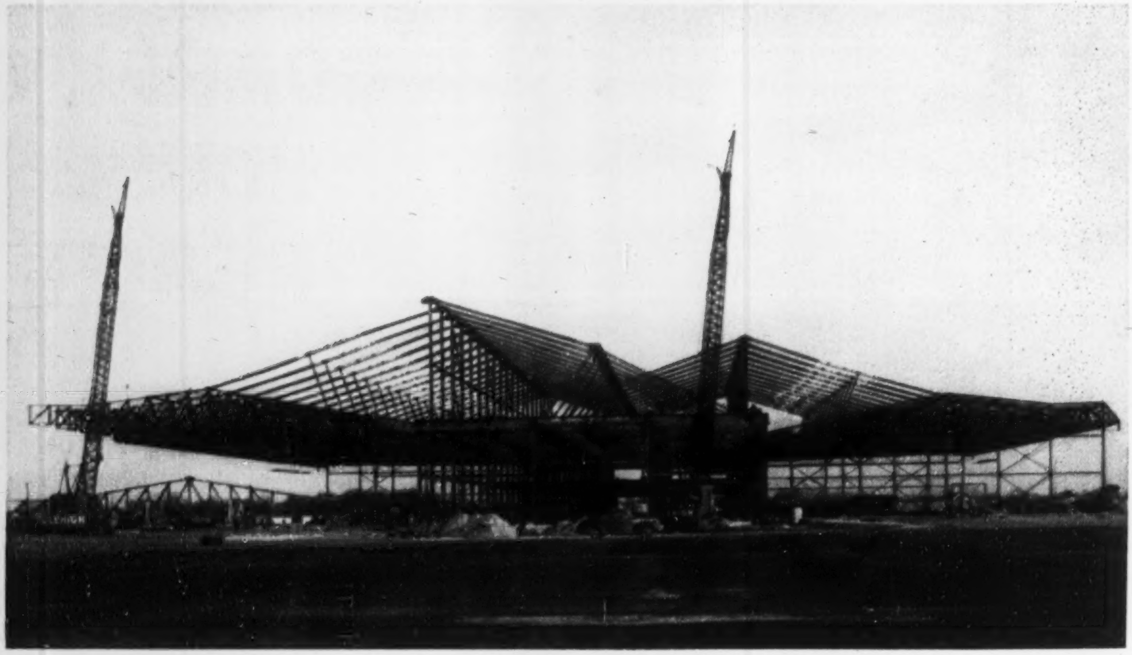


STEEL SUSPENDER FRAMES, to be left exposed above the roof, support welded cantilevered roof trusses of a new hangar at New York International Airport. Total cantilever length is 138 ft.

Techniques and trends . . .

Buildings and housing

The building industry enjoyed one of its biggest years in 1953, and the prospects for 1954 are for more of the same. At least one new record was set for construction volume in 1953, and one second-best was registered. In addition, several new records were established for long-span construction, and some noteworthy innovations in design and construction techniques made headway.

• **Commercial building sets record**—The new high mark for construction volume was set by nonresidential commercial building. A boom in shopping-center construction and continued interest in tall office buildings sent the value of contracts awarded last year for that category to $1.16 billion, topping the less-than-a-billion peak of 1950. This upsurge was not unexpected, in view of the elimination of governmental restrictions on building materials, the growth of suburbs and the demand for office space in most cities.

Since shopping-center construction is closely related to mass-housing volume, which is being maintained at a high level, and since consumer spending is expected to remain near its present rate, indications are that the shopping-center boom will continue through 1954. In addition, prospects for office buildings are good; surveys indicate a high potential demand for new office space in most cities. Thus, it should not be surprising if nonresidential commercial building sets another new record in 1954.

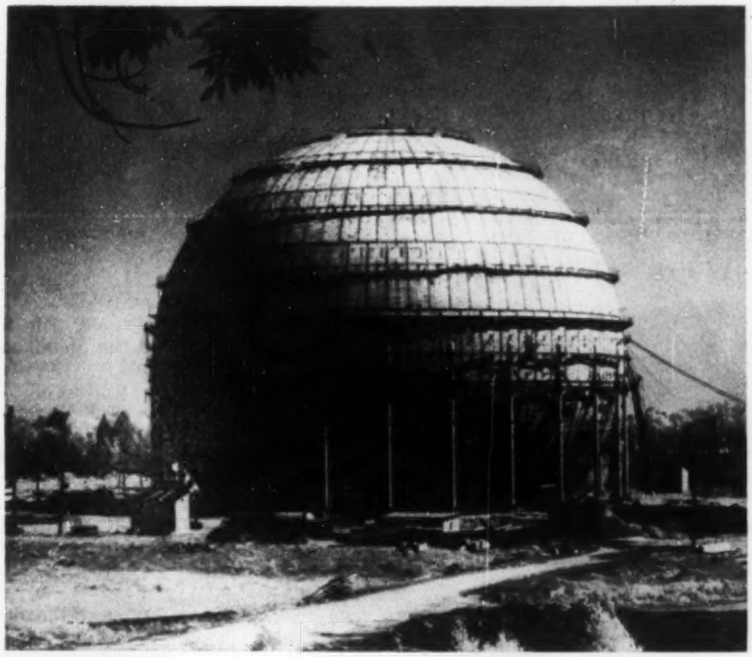
• **Industrial building near top**—The second-best in 1953 was registered by private industrial building. Though contract awards for defense projects fell off, expansion and updating of other types of production facilities more than made up the drop. The volume of private industrial building last year totaled $3.18 billion, nearly $0.5 billion better than the contract awards for 1952, the previous second-best year, but about $1 billion less than the record set in 1951.

Although it has been estimated that between 30% and 40% of U. S. industrial facilities are new since the war, there is no evidence that the country is overbuilt in its factories. All surveys of plans for capital expenditures are optimistic of continuing expansions, so that private industrial buildings may be expected to remain high in 1954—probably totaling to within 5% of the contract awards registered for last year.

• **Million-unit-year for housing**—Private homebuilders also had a banner year in 1953. They started about 1,060,000 units. Adding 36,000 public housing units, total starts for 1953 were 1.1 million, topped only by 1952 and the 1.4-million record high of 1950.

This marked the fifth straight year that residential-construction volume exceeded one million units and brought the total for the last seven years to eight million. With demand for new housing still high, and with the government ready to apply spurs should any severe slackening in housing starts become evident, signs point to another one-million-unit year in 1954.

In the meantime, homebuilders have been making plans of their own to ward off a recession. One scheme they have proposed would permit owners to "trade-in" their old houses when they buy a new one. If financing can be arranged, builders believe this would generate sufficient new construction to keep starts at a high level. But though the Federal Housing Administration broadened its mortgage insurance last September



STEEL SPHERE 225 ft in diameter, at the Knolls Atomic Power Laboratory, West Milton, N. Y., will house a test atomic power plant for submarines.

to cover trade-ins, there have been few applicants so far. Apparently, new housing is still selling well without the aid of trade-ins.

A second plan of the homebuilders is to find a market for their services in rehabilitation of slum areas. Toward this end, they have been pushing local enforcement of sanitation, building and zoning codes. They also have been urging better financing methods for renovations; for example, longer amortization periods for FHA-insured loans on remodeled dwellings. Incidentally, another object of this attack on slums is to demonstrate that public housing is unnecessary.

That Congress is sympathetic to the arguments for private redevelopment is evident from the decrease in number of public housing units constructed in the last few years. Though the Housing Act of 1949 authorized 810,000 units to be built over a 6-year period (an average of 135,000 annually), public housing starts totaled only 44,000 in 1950; 71,200 in 1951; 58,500 in 1952 and dropped to 36,000 last year. Prospects for next year are that only about 20,000 new public housing units may be started.

• AEC's effect–Last year also, as contracts awarded by the Atomic Enenrgy Commission fell off, the volume of non-residential public building dropped, too. AEC awards totaled $72 million, compared with $2.3 billion in 1952. Hence the $1.7 billion in contract awards for public buildings in 1953 was far below the record high of $4.3 billion set the previous year, and less even than the 1951 total of $2.5 billion.

During 1953, though, construction expenditures of the AEC, in contrast with its new contracts, averaged more than $100 million per month, or about 4% of the total construction spending for the continental U. S.–about the same rate as the previous year. At year's end, the rate climbed to 5%. It is expected to hold at that level or go slightly higher for a short period, then taper off gradually. Total AEC capital investment before depreciation now is more than $5.3 billion; but about $2 billion still is to be expended.

There is evidence that as AEC expansion of production facilities tapers off, a new construction program may be in the making. In the first place, the AEC announced last year that its breeder reactor was successful, indicating the possibility of producing more fuel than is consumed while producing power. With fuel reserves thus greatly extended, chances for private construction of atomic power plants were improved.

Next, the AEC awarded a contract to Westinghouse Electric & Mfg. Co. for the development of an atomic power plant to be built at one of the existing AEC facilities. Also, an agreement was signed with the Tennessee Valley Authority for a feasibility study of atomic power.

Then, President Eisenhower in a speech to the United Nations early this year proposed that the nations of the world possessing fissionable materials contribute to a pool to be used for peaceful purposes. It is reasonable to assume that if our government is willing to share fissionable materials with other governments, it should also be willing to share them with U. S. industries. As a result, prospects for a start on private construction of atomic power plants within five years appear bright.

• Fewer new hospitals–Also contributing to the decrease in new public buildings last year was the tapering off of the Veterans Administration hospital program, which is drawing to a close. The only construction contracts awarded by the VA in 1953 were for modernization of two hospitals–one at Lake City, Fla., and one in Minneapolis–a total of $5.5 million.

Only five new hospitals remain on the program. Congress has appropriated money for three of them–1,000-bed projects in Topeka, Cleveland and San Francisco, representing a total cost of about $25 million–but has refused twice to authorize the other two–500-bed hospitals in Cleveland and Washington, D. C.

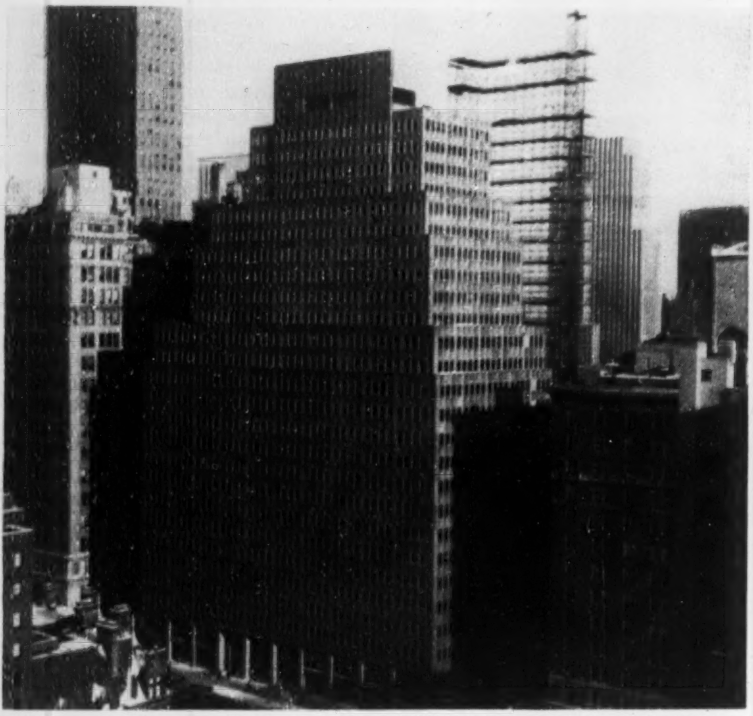
The U. S. Public Health Service hospital program also is slowing down. Projects approved annually dropped in number from a high of 449 in fiscal 1948 to about 270 last year. From a peak of $218 million under construction in 1952, new hospitals under way in this program dropped to $140 million in 1953.

Not enough local hospitals are applying to require the high volume of previous years. So Congress cut the appropriation in half last year, reducing it to $65 million–and that is about the level of the anticipated appropriation this year.

• More new schools–Congress, however is expected to be more generous with school aid to defense areas. Last year, $70 million was voted and the period for application extended to June 30, 1954. But by the end of 1953, the U. S. Office of Education received applications for nearly 1,000 projects, involving about $150 million of federal aid. Requests for more than $80 million for about 600 projects, therefore, will have to be held over. Indications are that substantial federal aid will be forthcoming to meet this need.

• Trends in building–With near-record volume of construction under way, it was inevitable that significant innovations in design and construction

(Continued on page 88)



ALUMINUM-FACED BUILDING in New York City was enclosed with 1,800 two-story-high panels in only 66 hours.

techniques be introduced last year, that new trends be established and that some older trends be made more apparent.

At an engineering conference last April, speakers indicated the type of thinking that lay behind contemporary design of industrial plants. Foremost influence is a concern of management for improved labor conditions. In addition, management recognizes the need for maximum flexibility in plant arrangements because of the ever-changing nature of manufacturing techniques.

Most new industrial buildings are one story high—flat-topped boxes. Use of roof monitors is on the wane. Less side-wall sash is being used, sometimes entirely omitted, in line with a trend toward air conditioning and better lighting. Speakers also noted a trend toward less masonry, but more steel, aluminum and precast concrete wall panels.

Height of one-story factories and bay dimensions appear to be getting larger. Clear heights of 18 to 20 ft are becoming nearly as common as 14 ft used to be, one speaker said. Such clear heights aid the installation of monorails, overhead conveyors and ducts. Bay spacing is growing—from 20x50 ft to 60x60 ft and larger.

A study of ENR contract awards indicated a trend toward construction of new large plants away from existing industrial centers. At the same time, there appeared to be a tendency for smaller plants to remain near those centers (ENR Feb. 19, 1953, p. 271).

In the construction of tall office buildings, the most significant trends were those toward greater use of air conditioning, and metal panels for exteriors.

In addition to aluminum and stainless steel, porcelain-enameled steel facings appeared to be making considerable headway in 1953. Metal panels are growing in popularity because they speed up construction, cut maintenance costs and are lighter in weight than masonry, thus enabling savings to be made in the cost of structural members and foundations. A 26-story office building under construction in New York City last year was enclosed with two-story high aluminum panels in 66 hours (ENR Aug. 13, 1953, p. 43). Despite the fact that the initial cost of the metal was higher than for masonry, the owner was sufficiently impressed so that he started another building shortly after with the same type of wall.

• **Air conditioning booms**—The trend toward air conditioning of office buildings took a surprising upturn last year. While air conditioning was installed in most major new structures, a large number of existing buildings began to add it last year. One equipment manufacturer found that he had for the first time in the company's history booked more orders for installations in existing office structures than for new ones.

In 1953 there also appeared to be a trend toward air conditioning of new homes. Sales of year-'round units jumped to 50,000, more than three times the number sold the previous year. In consequence of the growth of air conditioning in factories, office buildings and residences, and a growing demand for room units, the retail volume of all types of air-conditioning products grew from $1¼ billion in 1952 to $1¾ billion in 1953, a gain of 40%. For 1954, the estimate is at least $2 billion, and the $3-billion mark is expected by 1958.

Another noteworthy trend in office-building construction resulted from the introduction last year of a completely automatic elevator system (ENR May 7, 1953, p. 32). Operatorless, the new system coordinates the movement of each car in a bank of elevators with the operation of the other cars.

• **Span records set**—To meet the demand for larger and larger floor areas unobstructed by columns, and yet keep costs down, engineers tried several new techniques. With these, they set span records last year for certain types of steel, aluminum, timber and concrete construction.

Steel trusses erected for a Lockheed Aircraft Corp. factory in Burbank, Calif., set a record for three-hinged arches. They span 252 ft. It should be noted, however, that two-hinged, trussed rigid frames with 358-ft span were erected a few years ago in England (ENR April 8, 1948, p. 532).

Last year also, a span record was set for trussed rigid frames of aluminum—217 ft. These were erected for a hangar near London, England (ENR March 12, 1953, p. 66).

Bowstring trusses in a hangar at Westchester County Airport, near White Plains, N. Y., set a new world's record for timber roof spans. These trusses span slightly more than 248 ft, center to center of supports (ENR Sept. 3, 1953, p. 31). The design is especially noteworthy because top and bottom chords are single, glued laminated members, whereas it has been common practice in recent years to use chords composed of two timbers, between which web members are sandwiched. In the record-breaking trusses, one-piece web members are connected to the chords through steel plates, by means of shear connectors and bolts.

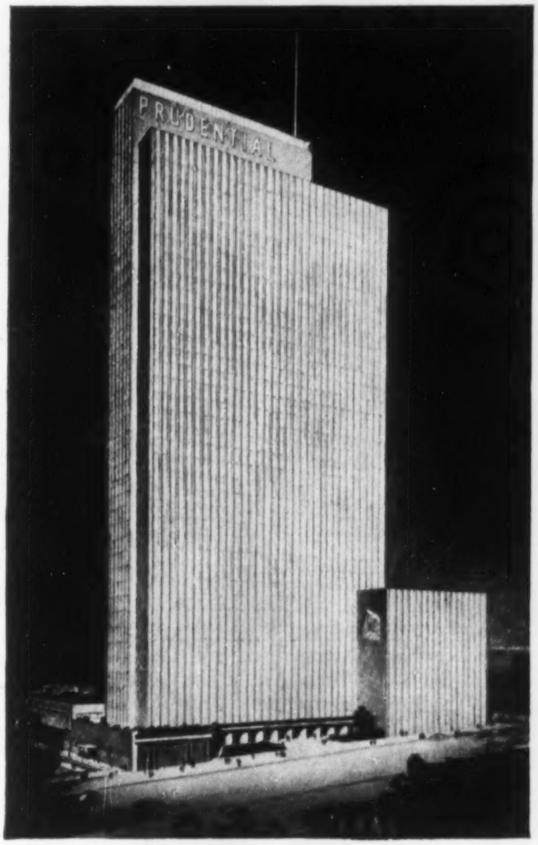
Another record was set by glued laminated timber arches in the new 200x180-ft field house at Montana State University. These are the largest

(Continued on page 90)

Buildings that make news . . . *(First of a series)*

Mid-America Home Office, Prudential Insurance Company of America, Chicago, Illinois

NAESS AND MURPHY, ARCHITECTS-ENGINEERS



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TIMBER ROOF TRUSSES cover 28 acres of floor area in a warehouse project at Franconia, Va. A total of 773 were erected.

timber arches ever made. Erected on 26-ft high concrete walls, they span 200 ft, rising 71 ft above the arena.

Also, last year a U. S. record was established for prestressed concrete girders by the roof members of a high school gymnasium in Greensboro, N. C. Precompressed with parallel-wire cables anchored with conical wedges at the ends of the girders, they span 120 ft (ENR Jan. 21, p. 36). Though longer prestressed girders have been constructed abroad, such as the 168-ft girders in a hanger at Melsbroek, Belgium, the Greensboro beams are noteworthy because they represent a three to fourfold increase in the span of prestressed roof beams in the two years since they were first used in the U. S.

• **Accent on cantilevers** – Another span record may have been set by steel cantilever roof trusses in a new maintenance hangar at New York International Airport. Of unusual design, the trusses, which are welded, project about 138 ft on both sides on a supporting tower (ENR July 23, 1953, p. 32). The framing consists of a roof truss about 120 ft long supported at midpoint of the top chord by an exposed suspender frame and at the inner end by a solid-web steel girder projecting from the tower. The exposed suspender framing, in turn, is anchored to the tower.

This project and several others that attracted attention last year appear to indicate that engineers are giving more consideration than heretofore to the use of cantilevers. For example, steel-truss cantilevers 122 ft long support the roof of a 780x200-ft hangar built for Boeing Airplane Co. in Seattle. There are only two steel columns inside the hangar, which is large enough to house four B-52 Stratofortresses (ENR Sept. 17, 1953, p. 45).

Another example is an 18-story combination office and apartment building under construction in Bartlesville, Okla. (ENR June 4, 1953, p. 23). In the 45-ft square tower rising 186 ft above grade, floors and walls at each level will be cantilevered from four concrete columns and bearing walls set well back from the exterior walls.

Both steel and reinforced concrete cantilevers were used for the new four-story Fifth Ave. office building of the Manufacturers Trust Co. in New York City (ENR Jan. 14, p. 24). To keep floor depth to a minimum, steel beams were framed in one direction and reinforced concrete joists in the other. Around the perimeter of the building, the steel beams cantilever out 20 ft and the concrete joists, 11 ft, to support glass walls. Incidentally, some of the panes will be the largest ever made–22x10 ft by ½ in. thick, weighing 1,500 lb. apiece.

Application of the cantilever principle to building erection also was found useful last year. A 93-ft trussed aluminum dome over the inner court of the Ford Rotunda in Dearborn, Mich., was erected from a central mast like an umbrella. The dome was supported at the crown during construction by the mast, which could be rotated to permit the erectors to work from a platform over the court. As successive circular rings, or collars, were placed, the mast was jacked up to make room for the next collar. The last ring of trusses was set with the outer sides resting on prepared steel supports on the court walls.

This dome also was noteworthy because of its light weight–total for the frame is 8.5 tons. Most members are only 0.04 in. thick, and the covering is a translucent, polyester-resin plastic reinforced with glass fibers weighing about 0.4 psf. The aluminum members were combined to form three-dimensional trusses (ENR May 28, 1953, p. 31).

An umbrella method of construction also was used by R. G. LaTourneau, Inc., for a 300-ft dia hemispherical aluminum building at its Longview, Tex., plant (ENR Dec. 17, 1953, p. 26). Exterior covering and reinforcing ribs were suspended from a central mast, which was removed when the dome was completed. This structure weighs 160 tons.

• **Precasting gets a boost**–From the large number of projects last year for which precast concrete members were prestressed, there appear to be some signs that precasting of long beams, which has never enjoyed wide success, may at last be getting a long-sought boost. The 120-ft prestressed girders mentioned previously, for example, were chosen when the engineer's cost estimate and contractors' bids indicated they would be the least expensive of the alternate designs considered. Prestressed, precast beams were used for a three-story building and a mezzanine at a Glenn L. Martin Co. plant in Baltimore, because of the saving in construction time. (ENR Nov. 26, 1953, p. 31). Several lift-slab projects were prestressed because of the reduction in weight made possible (ENR May 21, 1953, p. 27, and April 16, 1953, p. 39). (In the lift-slab method, floors and roof are cast on the ground-floor slab, then jacked into place.) And in Tacoma, Wash., a prestressed concrete factory building was erected to produce prestressed concrete elements (ENR March 19, 1953, p. 31).

The lift-slab method also made headway last year. Buildings were erected by this method in almost all parts of the U. S. and Canada. And the method was applied successfully to multistory buildings. Tallest structure built to date is a six-story nurses' residence for the general hospital at Winnipeg, Man.

• **Electricity dries wet silt**–Foundation construction got a boost last year from a new application of an old principle. Known as electro-osmosis, a method for dewatering silt with electrodes was successfully used on a power plant job near Bay City, Mich. (ENR April 30, 1953, p. 36). An ordinary steel pipe or rod was the anode; a wellpoint, the cathode. Direct current fed to the anode pushed capillary water to the wellpoint, from which it was

(*Continued on page 92*)

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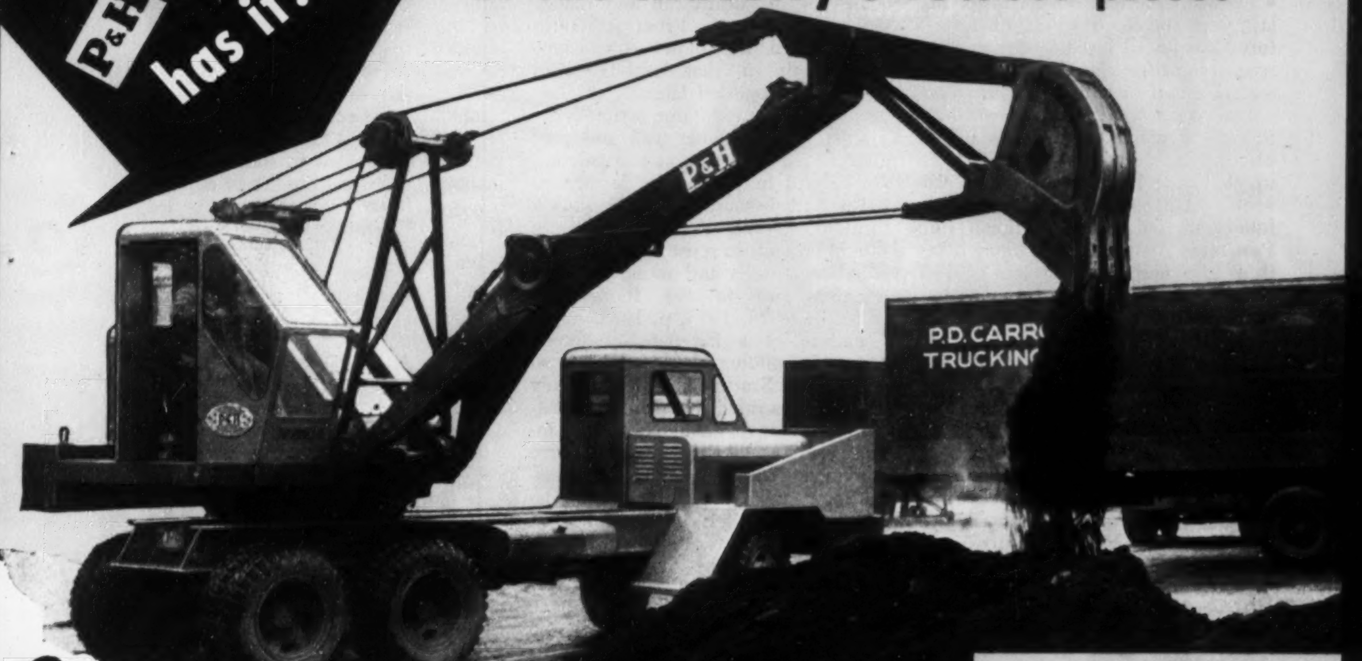
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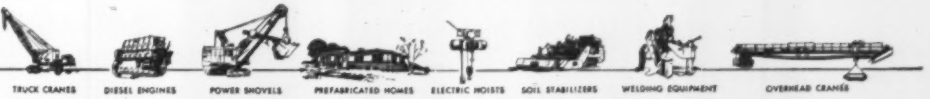
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discharged. Dewatered, the silt was converted into a stiff, sandy-clay formation, capable of carrying loads.

• Lessons from disasters—A major fire last year and high winds of several tornadoes forced building designers to re-examine their thinking on building materials and structural design.

Inadequate fire protection was held to be the major cause of an oil-fed blaze that devastated a 1,500,000-sq ft General Motors plant at Livonia, Mich. The plant was only four years old. The National Fire Protection Assn. blamed, among other things, an undivided fire area of 34.5 acres and inadequate sprinkler protection (ENR Oct 15, 1953, p. 24). The fire also was believed to have been fed and spread by an asphalt vapor seal that had been applied between the deck and insulation above. Research is developing a substitute seal.

Last year was unusual for tornadoes. A total of 530 hit the U. S., compared with the previous record of 300, registered in 1951. Areas were struck that had been thought immune, driving home the point that all structures should be designed for resistance to tornado forces.

The tornadoes left evidence in their wake that good construction could cut the death toll and reduce structural damage. From structures that resisted the blows conclusions can be drawn that bearing walls should be supported laterally at close intervals; that rigid-frame action is desirable; that frangible wall and roof materials in skeleton-type construction are helpful in preventing damage to the frame, because they are quickly torn loose; and that small homes should be built to resist racking forces, and floors, walls and roofs anchored together and to the foundations (ENR June 25, 1953, p. 108).

Failure of a flat-plate reinforced concrete building while under construction in Scarsdale, N. Y., last July also taught a valuable lesson. A Westchester County grand jury that investigated the disaster, in which three workmen were killed, stated in a presentment that defects existed in design, material and construction that may have caused or contributed to the collapse. The defects, in the jury's opinion, could have been averted by more adequate over-all inspection.

A report filed with the Scarsdale Village Board by its consulting engineers indicated that the defects referred to by the jury might have included low-strength concrete, misplaced or omitted steel reinforcing, possible lack of adequate reshores and exterior columns weak in resistance to bending (ENR Nov. 26, 1953, p. 22).

Disasters also led to some changes in building codes. Studies of damage resulting from 1952 earthquakes led to a new California law affecting seismic design of public buildings. The new law requires that structures less than 40 ft high be designed to withstand a horizontal force of at least 3% of the vertical design load. For buildings over 40 ft high, the present 2% minimum requirement continues to be applicable. In Dallas, Tex., following a costly fire in the 36-story Republic National Bank Building while under construction, the building code was amended to require builders to install a water standpipe for fire fighting up to the construction level (ENR July 16, 1953.)

Some major building projects

• Alcoa Building — The 30-story headquarters building in Pittsburgh, Pa., sheathed in aluminum, was occupied last year. Completely air-conditioned, offices are heated and cooled from aluminum ceilings. All electrical wiring and most of the plumbing are aluminum, as are lighting fixtures, elevator cabs, partition framing and interior trim. On the roof is the largest cooling tower ever built of aluminum.

• Allied Chemical and Dye Corp.—Two plants being constructed for the National Aniline Division to produce 20,000,000 lb of nylon fiber annually are about half finished. Plant A at Hopewell, Va., will manufacture monomer, and Plant B, in Chesterfield County, will consist of administration and laboratory buildings, a polymer building, spinning building for both staple fiber and filament yarn and several auxiliary buildings.

• Anaconda Aluminum Co.—Construction has started on a $60-million plant at Columbia Falls, Mont., including four potline buildings 87x1,130 ft by 65 ft high. Starting early in 1955, it will produce 50,000 tons of aluminum annually.

• Army Finance Center—Completed last month is an $18-million finance center for the U. S. Army at Fort Benjamin Harrison, Ind. The sprawling three-story structure, with partial basement, measures 996x612 ft. With its 1,552,000 sq ft of usable floor space, it is believed to be the second largest reinforced concrete office building in the U. S.—second in size only to the Pentagon. Floors and roof are flat-slab, with drop panels, on columns spaced 24x24 ft to support a live load of 175 psf.

• Arnold Engineering Development Center—Early this year, the first of the Air Force's three giant test units—the Engine Test Facility—at this $170-million project near Tullahoma, Tenn., will be operative. Next on the schedule is a gas dynamics facility, finally a propulsion wind tunnel.

• Atomic Energy Commission—Construction expenditures averaged slightly more than $100 million per month last year. Total capital investment now is more than $5.3 billion, and about $2 billion more still is to be spent. Five major production facilities where construction is under way will account for $6.5 billion of the investment. When completed, expenditures for production plant, communities, research and other facilities will amount to $1.7 billion at Oak Ridge, $1.5 billion at Savannah River, $1.2 billion at Portsmouth, $1.1 billion at Hanford and $0.9 billion at Paducah.

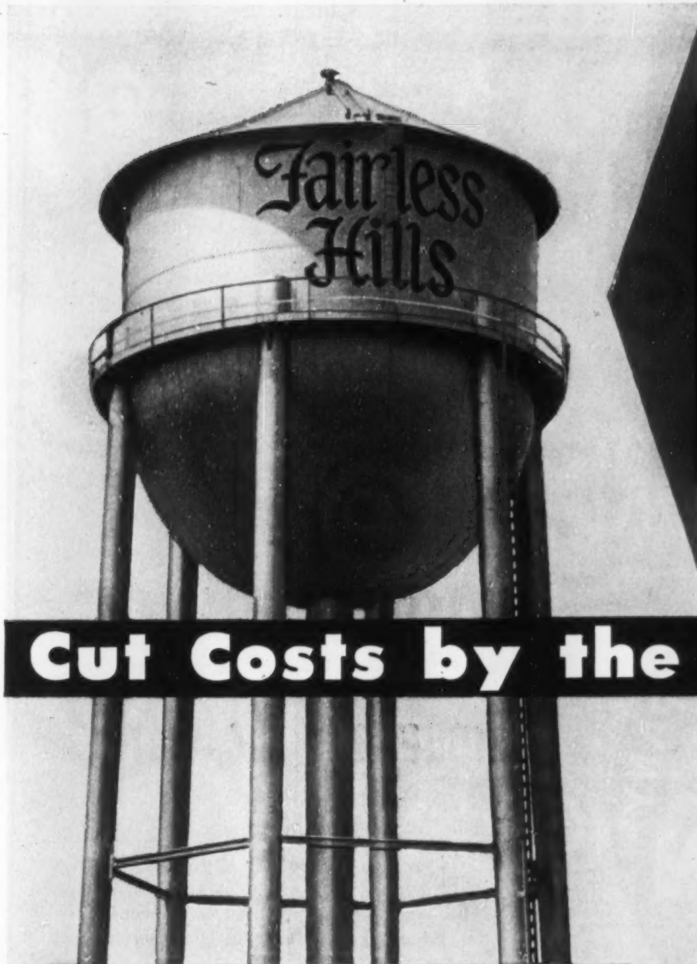
• Birdsboro Foundry Facilities—At a cost of about $24 million, 11 buildings with 470,000 sq ft of floor are being completed in Birdsboro, Pa., for casting of armored tank hulls and turrets.

• Buckeye Cellulose Co. — A $30-million chemical dissolving pulp plant to produce 300 tons of pulp daily is scheduled to be completed in the middle of this year in Foley, Fla. Because of the warm climate, building walls have been omitted where-ever possible.

• California State Buildings — Some $50 million of major building projects for use by the State of California are under way. Work has started on a $10-million building for the state department of employment in Sacramento. Of structural steel and concrete, the five-story, two-block-long office building will fit into a master mall plan drawn up for the city. At Costa Mesa, in Southern California, $2.2 million in contracts were let for the $11-million Fairview mental institution. Completion of the project is set for 1955. For the biggest of the state's new prisons, near Vacaville in Northern California, $12 million is under contract for the $20-million institution. And construction is continuing on the Porterville mental home, to cost a total of $16 million.

• Carson Park Mutual Homes—Formerly called Lakewood Park, this Southern California development will have a total of 13,897 homes when 158 units are completed in February. In 1953, a total of 3,141 homes were finished. Construction of 3,200 more is planned in 1954. Cost of the two- and three-bedroom homes is $10,000 to $12,000. A 154-acre shopping center, one-fifth completed at the end of 1953, will have 75 stores and specialty shops by the spring of 1954. Construction of 40 more shops, a department store and

(Continued on page 95)



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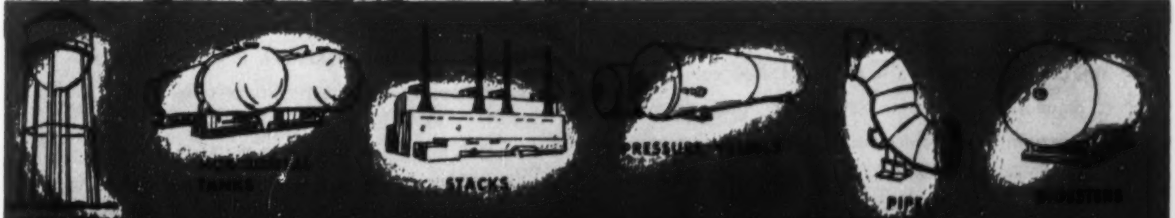

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a 250-bed Lakewood hospital will start sometime in 1954. Construction of a medical center consisting of 10 buildings will begin in the spring of 1954.

• **Colorado Fuel & Iron Co.**—The first seamless-tube mill west of the Mississippi was finished in October. Costing $30 million, the 10-acre plant has a monthly production capacity of 12,000 to 15,000 tons of tubing.

• **Corpus Christi Auditorium**—In only 25 working days, 260 tons of steel covering 65,000 sq ft were erected for the arched roof of the Municipal Civic Auditorium in Corpus Christi, Texas. Of lamella construction, main members span 224 ft between supports on a skew, the areas included between intersecting members being diamond shape.

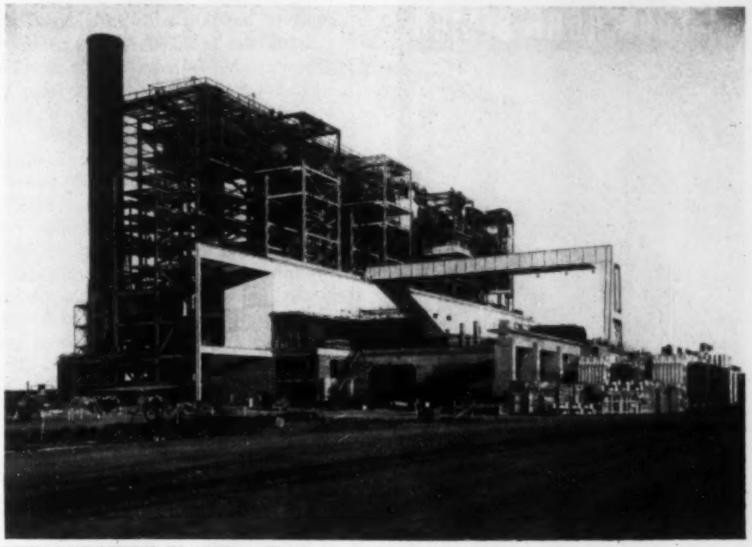
• **Cross County Shopping Center** – Construction started last year on the $30-million project on a 68-acre site in Yonkers, N. Y. It will provide 1,000,000 sq ft of selling and office space in nine buildings, including an 8-story office structure, and will have parking facilities for 5,400 cars.

• **Courtaulds, Inc.** – A $21-million plant completed last summer, capable of producing 50,000,000 lb of viscose-rayon staple annually, boosted U. S. production of this commodity 25%. The six-building plant, located on a 550-acre tract about 20 miles north of Mobile, was designed for continuous and fully automatic operation.

• **Detroit Civic Center**—Building No. 3 in the city's civic center development center —the $4.1-million Henry and Edsel Ford Auditorium—is 4% finished, with completion scheduled for Dec., 1955. The 280x190-ft building will be a structural steel frame encased in concrete, with reinforced concrete foundations supported on piles driven to rock. The main auditorium will seat 2,900 persons. A $26-million city-county building, under construction since July, 1951, is scheduled for completion in June, 1955.

• **Electric Energy, Inc.**—Two units of 156,000-kw capacity apiece were installed during 1953 in the steam-electric power plant at Joppa, Ill. Two more will be installed in 1954, and two the following year. Estimated cost of the plant with the first four units is $118,252,000.

• **Equitable Building** – Work started in October on a $10-million, 25-story skyscraper in San Francisco for Equitable Life Assurance Society. A steel frame building, it will have aluminum spandrels and stainless steel mullions. At year's end foundation work was underway. Completion is set for Oct., 1955.



STEAM POWER PLANT at Pittsburg, Calif., will have four turbo-generator units outdoors (on concrete foundation, at right).

• **Ford Motor Co.** – Another unit – the Styling Building, for designing passenger cars and trucks—was added to the $80-million Research and Engineering Center in Dearborn, Mich., at a cost of $11.5 million. This year, a 960,000-sq ft stamping plant will be completed near Cleveland, Ohio. Still under construction are a 500,000-sq ft engine plant addition near Cleveland, and assembly plants, with 1,500,000 sq ft of floor area in each, at Louisville, Ky., and San Jose, Calif.

• **General Electric Co.**—The $200-million headquarters for the Major Appliance Division, at Appliance Park, near Louisville, Ky., is 65% complete. Two of five manufacturing buildings were finished last year, and a third is nearing completion. About 100 acres of the 942-acre site will be under roof by the end of the year. Also nearing completion is a $25-million power transformer plant at Rome, Ga., with nine buildings having a total floor area of 550,000 sq ft.

• **General Motors** – Ternstedt Division plant covering more than 27 acres of a 247-acre site near Flint, Mich., is substantially completed. Also the dual-purpose, airplane-automobile assembly plant at Arlington, Texas, with 1,295,000 sq ft of manufacturing area and 92,000 sq ft of office space was finished last month.

• **Grumman Aircraft Engineering Corp.**—Nearing completion at Calverton, N. Y., five buildings of a new plant are being enclosed with 170,000 sq ft of concrete sandwich panels. Sealed against the noise of jet aircraft, these structures will be air conditioned. The project also includes one 7,000-ft and one 10,000-ft runway, 132,000 sq yd of apron, water supply, sewage disposal facilities and railroad spurs. Runways and taxiways are paved with bituminous concrete, while runway ends, test pads, aprons and hard stands are paved with concrete.

• **Harvey Aluminum**—Site preparation at The Dalles, Ore., has been underway since mid-1952 when Harvey Machine Co. announced it would build a $35 million plant to produce 54,000 ton of aluminum a year.

• **Henry Ford Hospital**—A 17-story air-conditioned Clinic Building in Detroit, Mich., will be completed next fall. It has a bolted steel frame and exterior walls of brick, with limestone trim.

• **Hilton Hotel**—Construction in Beverly Hills, Calif., of a $14-million hotel, began in Sept., 1953, and is scheduled for completion in Dec., 1954. The 8-story structure will have 450 rooms with specialty shops located at street level.

• **Ivy Hill Park**—This $20-million housing project in Newark, N. J., will contain 2,095 apartments in five 14-story reinforced concrete buildings, now approaching completion. Buildings occupy only 9% of the 25-acre site.

• **Lambert-St. Louis Field**—The unusual roof of the $4.5-million terminal building at the St. Louis, Mo., municipal airport is under construction. The roof is composed of three units, each consisting of two intersecting thin-shell reinforced concrete barrel arches, which will have a span of 120 ft and a rise of 32 ft. The

(Continued on page 96)

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shells are 4½ in. thick. The three-level concrete building will be enclosed with glass on the field side and brick on the opposite side. Initially, it will be 438 ft long, but eventually will be double that length.

• **Levittown, Pa.**—Starts total 7,000 and completions 5,000 in this 3,600-acre project near U. S. Steel's Fairless Works. By June, two years after completion of the first house in the project, the job will be two-thirds completed, with nearly 10,000 houses finished out of 16,000 planned. These units sell for $9,500 to $11,000. This year a 1,500-house section is being started, to sell at $15,500 each. These units will have 2,000 sq ft of floor area and two baths. The main shopping center, with seven stores and a 60-acre parking area, will be completed in mid-summer.

• **Massachusetts Institute of Technology**—A $1.5-million auditorium seating 1,200, of unusual design, is scheduled for dedication this summer. Its roof will be a thin-shell concrete dome (one-eighth of a sphere) supported at only three points, each a ball joint on heavy abutments. The dome will be cut away between these points for segmental window walls.

• **Mayo Memorial Medical Center**—The $11.5-million, 17-story main building on the campus of the University of Minnesota in Minneapolis will be completed this spring. Beam-to-column connections in the steel frame were made with high-tensile-strength bolts. Concrete floors were pumped into place. In placing a penthouse roof, a record height of 176 ft 4 in. for pumping concrete was established. Suspended scaffolding, continuous around the structure and canvas-enclosed to permit work in all weather, enabled masons to lay 995,000 face brick in three weeks.

• **Mellon Square Garage**—Of reinforced concrete construction, this 230x260-ft structure in Pittsburgh, Pa., contains six levels below grade for parking 890 cars. Excavation for the $3.5-million project started last August and completion is scheduled for April, 1955.

• **Mile High Center**—Steel has been erected for a 23-story office building, main unit of this $15-million Denver, Colo., project. The exterior of the 152x127-ft tower will consist of large areas of glass in aluminum sash, interspersed with gray anodized aluminum panels over the spandrels and columns. Above the spandrel panels and separated from them by 12-in.-high glass panes will be 2-ft deep horizontal panels of eggshell-white porcelain-enameled steel, which will cover perimeter heating and cooling units. Similar panels will be applied vertically to cover air risers. Other buildings on the 301x266-ft site will be a transportation building to be used as an airline terminal, a bank, a restaurant and a parking garage.

• **National Container Corp.**—Nearly completed near Valdosta, Ga., a $26-million board mill, probably the largest in the U. S., will produce 500 tons per day. Key units are under one roof, with an over-all length of 850 ft. The building has a structural steel frame, corrugated asbestos-cement walls and corrugated plastic windows.

• **Naval Ordnance Test Station**—Two 357-ft-high structures built at the test station (near Inyokern, Calif.) are the tallest timber towers in the U. S. Standing 600 ft apart, they are designed for a 110-mph wind and a 28-ton load supported 250 ft above the ground between towers.

• **Navy Radio**—The world's most powerful radio transmitter was placed in operation in late 1953 at the U. S. Naval Radio Station, Arlington, Wash., completed at a cost of more than $10 million. The project involved the erection of 15 miles of 1-in. antenna in ten spans of 5,600 to 8,700 ft, between twelve 200-ft towers.

• **New York City Board of Education**—Bids were received last year for 28 projects—1 high school, 7 junior high schools, 6 elementary schools and 14 modernizations and additions—for a total cost of $42.8 million. Most of the buildings are of flat-slab reinforced concrete construction, with unplastered, but painted ceilings. Partitions are lightweight concrete blocks, unplastered.

• **New York City Housing Authority**—Completed in 1953: Smith (Sec. II), Edenwald, Cooper Park and Throgg's Neck Houses—five projects containing 4,719 apartments—at a cost of $60.3 million. Still under way: Bronxdale, Gravesend, Van Dyke (Sec. I and II), Highbridge, Mariner's Harbor, Baruch (Sec. I), Washington (Sec. I), Foster (Sec. II), Sound View, South Jamaica Extension, Brevoort (Sec. I and II), St. Nicholas (Sec. III), Jefferson (Sec. I), Forest (Sec. I), Red Hook Extension, Cypress Hills, Carver (Sec. I) and Hammel Houses—20 projects containing 14,722 apartments—at a cost of $191.5 million.

• **New York Coliseum**—Demolition is under way in preparation of a site for this $40-million project at Columbus Circle in New York City. In addition to a $20-million convention hall with 225,000 sq ft of floor space and garage, the project includes two 12-story apartment buildings.

• **Pacific Gas & Electric Co.**—Units 4 and 5 of the Contra Costa steam plant were put on the line during the year, adding

235,000 kw to the plant at a cost of $30 million. Work is in progress on the $80-million Pittsburg steam plant, whose four units with total capacity of 600,000 kw will be in operation in the summer of 1954, and the Morro Bay steam plant, in San Luis Obispo County, with 300,000-kw capacity, to be finished in mid-1955 at a cost of $44.3 million.

- **Park City Houses**—Work started late last year on a $48-million, 4,000-unit apartment house project in New York City. There will be twenty-four 14-story buildings of flat-plate reinforced concrete construction with brick cavity-walls on the site.

- **Parr Warehouse Co.**—Timber roof trussses cover 28 acres of floor area in a warehouse at Franconia, Va. The building measures 2,002x500 ft. A second building, also with timber-truss roof, in the same project is 500x500 ft. Walls are precast concrete panels, up to 20x26 ft, weighing 20 tons. The project was completed last August, nine months after construction started.

- **Penn Center**—Foundations are being constructed for a $15-million, 20-story office building, first unit on the site of the former Broad St. station of the Pennsylvania Railroad in Philadelphia, Pa. Completion is set for early 1955.

- **Port of New York Authority**—Steel has been erected for a $3 million hangar with unusual welded framing at the New York International Airport. Roof construction for the 400x375-ft building consists of exposed steel suspender frames supporting cantilevered roof trusses. The cantilevers extend 138 ft from both sides of a 2-story central tower in which shops and offices will be located.

- **Price Tower**—Foundations are being built for an 18-story combination office and apartment building in Bartlesville, Okla. Rising 186 ft above the ground, the reinforced concrete tower will be composed of four quadrants, three to be occupied by offices and one by an apartment. Floors will be cantilevered from four vertical supports. Faces of the tower will be 45 ft wide.

- **Prudential Insurance Co.**—The substructure has been completed, with 260 concrete caissons extended to rock, for a $40-million, 41-story office building over 19 tracks of the Illinois Central R. R. at Randolph St. and Michigan Blvd., Chicago. At year's end, 10% of the 31,000 tons of structural steel for the superstructure was erected; the remainder is scheduled to be in place this October. Completion is expected in Sept. 1955.

(*Continued on page 98*)

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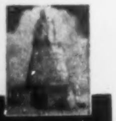

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...Cost advantages if eaves over 12′.
Ease of daylighting work area.
Recommended for future expansion in width.

CAREW FLAT TRUSS ROOFS

For Masonry Wall Construction
An economical roof system for load bearing masonry walls.
Construction speeded — walls erected while roof is being delivered.

Steel Supported Flat Truss Roof
Has cost advantages for eave heights over 12′ or where continuous sash is desired.
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Major building projects

• St. Mary's Square Garage—The $2-million partly underground structure in downtown San Francisco was started in March, 1953, and is expected to be completed next March—a month ahead of schedule despite a laborers' strike. By the end of the year, the building was 70% complete, with concrete poured for the first four floors (the fifth floor and roof still to be poured). Capacity of the garage: 1,025 cars.

• San Manuel Copper—As part of a $125-million development program, this subsidiary of Magma Copper Corp. is building a $24-million townsite 40 miles northeast of Tucson for employees. A $50-million concentrator plant, part of the project, is expected to be in production in 1955.

• Southern California Edison—Etiwanda Steam Station was completed in the latter part of 1953 at a cost of $39 million. Initial installation consists of two 125,000-kw turbo generators. Construction of Redondo Steam Station No. 1, started in 1952, is scheduled for completion in the fall of 1954. Costing an estimated $25-million, the station will have one 156,000-kw turbo generator. Construction of a $24-million steam-electric generating station at El Segundo, Calif., was started the latter part of 1953. The initial installation, scheduled for operation in July, 1955, will consist of one turbo generator unit, a duplicate of the unit at Redondo No. 2.

• State University of New York—Construction started last April on the Basic Sciences Building, first unit of the new Medical Center in Brooklyn, N. Y. Estimated to cost $14.5 million, the building will be 11 stories high and 648 ft long. Moving stairs will transport the 800 medical students from floor to floor. Completion is expected in 1956.

• Statler Co.—Exterior wall panels are being set in place for a 16-story reinforced concrete hotel in Hartford, Conn. These are sandwich panels with an exterior facing of porcelain-enameled steel. Costing $5.2-million to build, the hotel will provide 455 rooms. Also, an 18-story hotel of cantilevered flat-plate reinforced concrete construction is being built in Dallas, Texas, with completion scheduled for the middle of next year. Columns spaced 29 ft apart are set back 10 ft from the building face. In plan, the building is similar to an airplane with swept forward wings. Lateral stiffness and resistance to wind forces are provided by reinforced concrete shear walls at the tips of the "wings" and the end of the "fuselage."

• Stonestown—Basic construction was completed last year on this $15-million shopping center that serves San Francisco's Stonestown apartment development. Developers leased 13 new stores during the year and at year's end were negotiating for lease of the last unoccupied space.

• Tennessee Valley Authority—Seven steam-electric power plants aggregating over $900-million worth of construction and installed equipment are in various stages of construction by TVA:

Johnsonville, first plant started in this current steam-power program, has its six authorized units on the line for a total of 750,000 kw. It is on Kentucky Lake in central Tennessee.

In northeast Alabama, downstream from Chattanooga, Tenn., Widows Creek plant is due to have its sixth 125,000-kw unit producing next summer.

Shawnee plant, being built west of Paducah, Ky., is firing up boilers as they are completed to help supply power to the nearby Atomic Energy Commission installation. By summer of 1955, this plant is due to have ten 150,000-kw units completed at a cost of $216.5 million.

The world's largest steam plant in total capability will be the 1,600,000-kw Kingston plant on Watts Bar Lake near Oak Ridge, Tenn. First unit of the $213-million giant is due to go on the line this month; its ninth and last is scheduled to be producing by the end of next year.

Colbert plant near Muscle Shoals, Ala., will put the first of four 200,000-kw units in operation late in 1954.

John Sevier's three 200,000-kw units on the Holston River in northeast Tennessee are in the foundation construction stage with first power to be brought in by mid-1955.

Gallatin is at present a 500,000-kw capability project with two 250,000-kw units. These are the largest single-shaft steam units to be manufactured. The $85-million project, on the Cumberland River east of Nashville, is still in the grading and excavating phase.

• Tishman Realty & Construction Co.—In only 66 hours, a 26-story office building at 99 Park Ave. in New York City was completely enclosed with aluminum panels. A total of 1,366-man-hours was expended in covering 98,363 sq ft of building with 130 tons of aluminum. The feat was accomplished with prefabricaated panels two stories high, which were bolted to the structural steel frame. Construction started in November on a second aluminum-faced skyscraper at Park Ave. and 57th St., to be 22 stories high.

• U. S. Signal Corps—Construction of a $33-million depot at Tobyhanna, Pa., is nearing completion. The project includes 25 buildings, with 3,160,000 sq ft of floor area, a sewage treatment plant and two 600,000-gal ground storage reservoirs.

• Valley Steam Plant—Construction continues on the $75-million, 512,000-kw Valley Steam Plant of the Los Angeles Department of Water and Power. Generators for the two 100,000-kw units of the giant four-unit plant were delivered during 1953. Also, contracts were awarded last year for the third generating unit, including a 156,000-kw capacity generator and the boiler. Construction of the fourth unit of 156,000-kw capacity was authorized.

- **Veterans Administration**—Thirteen new hospitals and four additions, with a total of nearly 10,000 beds, were opened last year. Hospitals in Los Angeles (1,000 beds), New York (1,252 beds), Pittsburgh (742 beds), Cincinnati (495 beds), and a 500-bed addition in Dallas will be completed this year.

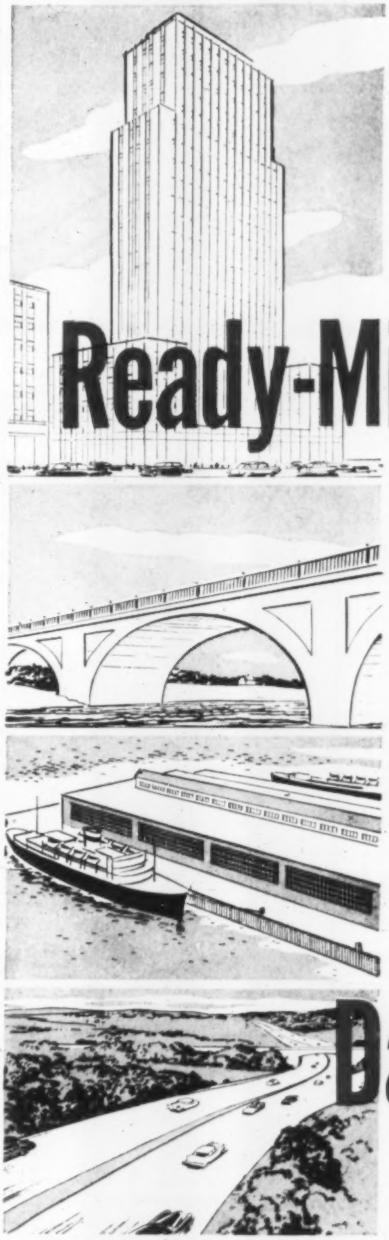
- **Westchester County Airport**—A new world's record for timber roof spans was set by the bowstring trusses erected for a hangar at the airport near White Plains, N. Y. The trusses span 248 ft, center to center of supports. The $2-million hangar is 750x150 ft, with a two-story 750x31-ft leanto along the rear.

- **Westinghouse Electric Corp.**—A $45-million plant with 2,000,000 sq ft of floor area for the Electric Appliance Division has been completed near Columbus, Ohio. The manufacturing building is 2,172 ft long and 882 ft wide, one story high. Structural framing for the plant required 11,400 tons of steel.

- **White Pine Copper Co.**—The $70-million development at White Pine, Mich., is about 70% complete. In addition to the mining facilities, the project includes the construction of a townsite and housing for employees.

- **Wyman-Gordon**—Expansion of an existing plant for manufacturing aircraft parts at North Grafton, Mass., is nearly completed. The original 400x180-ft building on the site was doubled in length and width, and a second 800x360-ft building constructed. In addition, a 495x76-ft administration building was added. Construction involved placing of concrete foundations preparatory to the installation of a 35,000-ton and a 50,000-ton hydraulic press.

- **Yeshiva Medical Center**—Construction started in October on $10-million Albert Einstein College of Medicine, initial unit of this $25-million project in New York City. The college will consist of a 10-story wing containing the school section, and an adjoining 3-story administration and library wing. A 750-seat fan-shape auditorium will project over the wing and will form a porte-cochere over the main driveway entrance.



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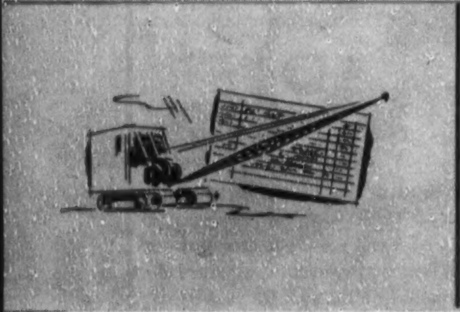

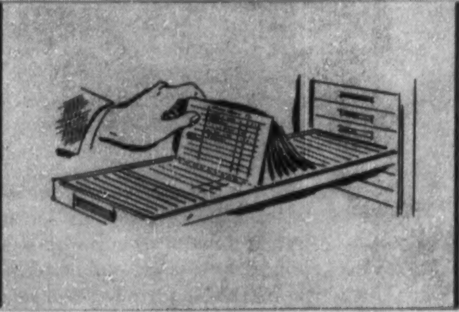

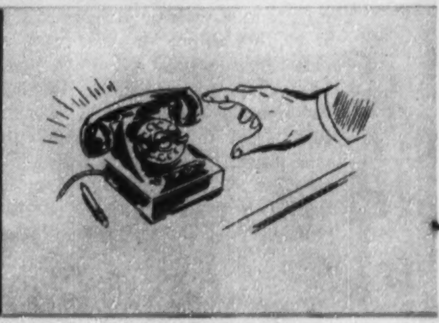

1. File cards, describing each of your machines and its wire rope requirements are filled in by your Broderick & Bascom distributor with facts supplied by you. Wire ropes needed are ordered from stock from one of the ten regional Broderick & Bascom warehouses, ready for delivery when needed.

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SPEEDI-SERVICE PLAN

Now you can insure immediate delivery of wire rope! Now you can increase equipment earning time, decrease down time! Now you can be sure of getting the right line at the right time!

Now you can save time and money with the Yellow Strand Speedi-Service Plan!

There's no extra cost, no obligation. All you do is have your nearby Broderick & Bascom distributor register your equipment. He will maintain an automatic filing system containing information on your wire rope needs.

Then when you need rope, just call, giving the machine make, model and the particular rope needed. The exact size, length and type will be obtained from your record file and the order will be filled from stocks controlled by these records. Immediate delivery is made according to your recorded instructions.

Start saving time and money with the Yellow Strand Speedi-Service Plan. Call your Broderick & Bascom distributor or mail the coupon — today!

YOU BENEFIT FOUR WAYS!

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3. You standardize on tougher, Yellow Strand Wire Rope!
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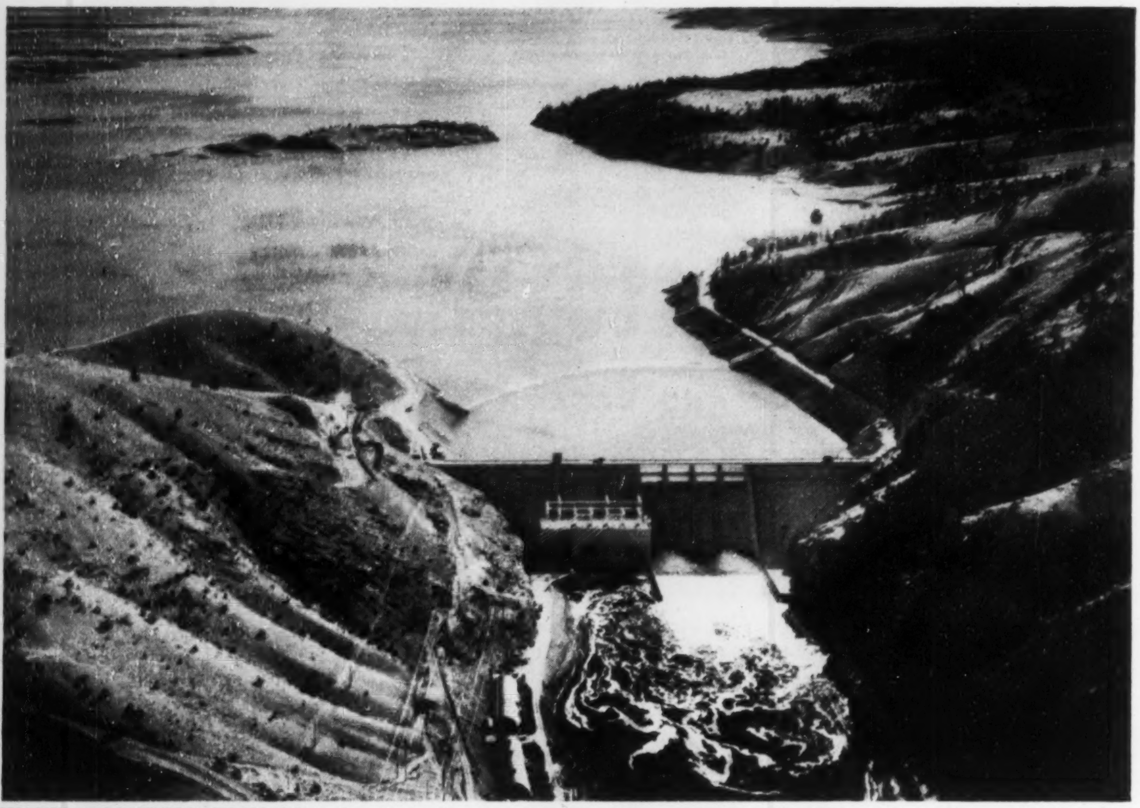


WATER FOR IRRIGATION—More than two million acre-feet of water are collecting behind Montana's newly completed Canyon Ferry Dam for irrigation of additional lands in the upper Missouri Valley.

Techniques and trends . . .

River use and control

Despite a slowdown in work actually under construction, 1953 was an active year in river development. It was, however, a year more important for decisions and proposals made than for projects initiated. The new administration's pressure for economy in government hit federal river work hard; a new policy more conducive to local-federal cooperation emerged; and federal government plans, evolved over the years, were challenged.

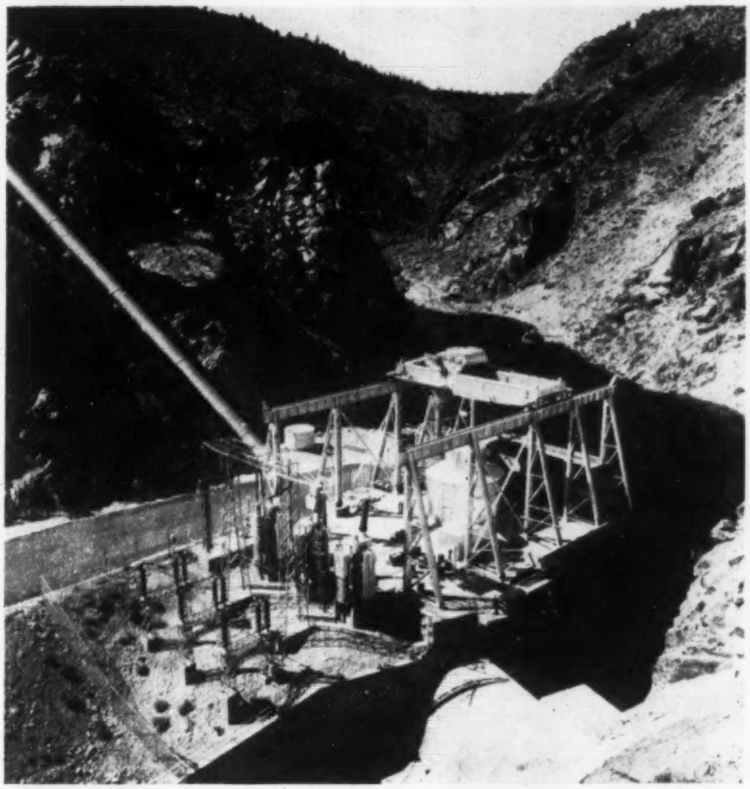
Public works in the field of water use and control were actually 25% off their 1952 rate of contract awards, and no new federal projects of significance were put under construction. But important actions were taken indicative of new thinking about the part the federal government should play in the future development of the nation's water resources.

Already, signs begin to appear that 1954 will see some setup in the construction of federal river-use projects. In his State of the Union address, President Eisenhower said 23 projects would be initiated by the federal government. But these are expected to be mostly smaller jobs—the largest in the $20-million class.

Larger projects in the offing are to be locally or privately financed and built. On the St. Lawrence River in the Northeast, the Canadian River in Texas, and the Feather River in California and streams of the Northwest—to name a few outstanding projects, are in the offing, which suggests that 1954 will be a year in which new local projects will overshadow anything initiated in Washington.

• Signs of policy change—In the Far West, where the federal government has played a major role in water resource development for more than 20 years, local agencies (public and private) were assuming the initiative last year. California continues to study the feasibility of its idea of buying the vast Central Valley Project from the federal government. The Interior Department would consider any legitimate proposal—but would insist on purchase of the entire works and completion by the state of all currently authorized elements. California is sincere in considering this deal, but, moved by its need for still more water, it is quite apt to pass it up and, instead, put the money into development of further new supplies. The state legislature has had before it a $1.2-billion Feather River project for irrigation and power involving transportation of water through a 570-mile conduit. This plan is now in the detailed design stage, and other schemes are being studied.

In the Pacific Northwest, where the need is for hydroelectric power (annual load growth is about 600,000 kw), the Interior Department's August pronouncement of a new policy on power broke a logjam of proposed work. Applications to build hydro-power on streams of the Northwest have poured into the Federal Power Commission, and extensive new work by local interests can be expected. The majority of the sites being applied for are clear of projects studied and planned for ultimate federal development. Appar-



POWER FOR A CITY—Los Angeles will be supplied hydro-power from this and two other Owens Gorge plants put in service last year.

ently, local interests expect such projects to be federally built eventually.

• Questions still to be answered—In the Missouri Valley, the last administration's Missouri Basin Survey Commission reported last year, with its majority favoring a five-man federal control group (not an MVA) to direct planning, construction and operation of water resource development by agencies already active in the area. The minority proposal of a state-federal compact approach is perhaps more in line with the current administration's thinking; no immediate action should be expected.

In the Kansas River Basin, Corps of Engineer flood control reservoir projects were challenged by consultants for the state of Kansas—reviving an old basic question of levees versus reservoirs. Specifically, on this particular watershed, it was claimed by the consultants that improved and widened channels to pass floods safely through cities could be built at one-fifth the cost of federal dam projects proposed and under way. Work on current dam projects in that area—notably Tuttle Creek Dam—ground to a halt during the year.

• Progress on the St. Lawrence—In the East the biggest policy decision of 1953 resulted in the issuance of a license to the Power Authority of the State of New York to build the $261-million St. Lawrence power project. Confident that suits appealing this FPC decision will not successfully appeal a recent adverse court ruling, the state agency has contracted for design of the dams and powerhouse in the International Rapids section of the St. Lawrence. Meanwhile, the Hydro-Electric Power Commission of Ontario is losing no time working toward development of its sorely needed half of the site's power potential.

Ontario Hydro is also hard at the construction of work to develop power awasting at Niagara Falls. Development of some 1,300,000 additional kilowatts available on the U.S. side there remains tied up in a jurisdictional dispute. A combine of five New York electric companies would like to build the needed facilities; New York's influential Governor Dewey is determined that no private interests should exploit what traditionally has been accepted as belonging to all the people of the state, and that therefore the State Power Authority should build the plant and sell power to private utilities for distribution; and the Corps of Engineers doubtless would build the necessary works, if asked.

Bills to settle the dispute kicked around in Congress last year, but President Eisenhower is known to favor letting the FPC decide who will build at Niagara. The President is also anxious to see action on the St. Lawrence Seaway, the 27-ft channelization project planned to pass transoceanic shipping 2,200 miles into the Great Lakes and to Midwest ports. Perhaps 1954 will be the year for passage of the long-discussed legislation necessary for this project.

Roanoke Rapids, hotly contested hydro-power site in North Carolina, near the Virginia line, was assigned to Virginia Electric & Power Co. last year by the courts. The previous administration's Interior Department had appealed the issue of an FPC license to the private company.

The present administration's Interior Department has claimed neutrality in a similar haggle still under way over who should build what on the Snake River in Hell's Canyon, Idaho. It has presented the federal government's plan for a single $357-million dam and power project; Idaho Power Co. has filed application to build three dams at an estimated $134 million. FPC has heard reams of testimony, and a decision is about due.

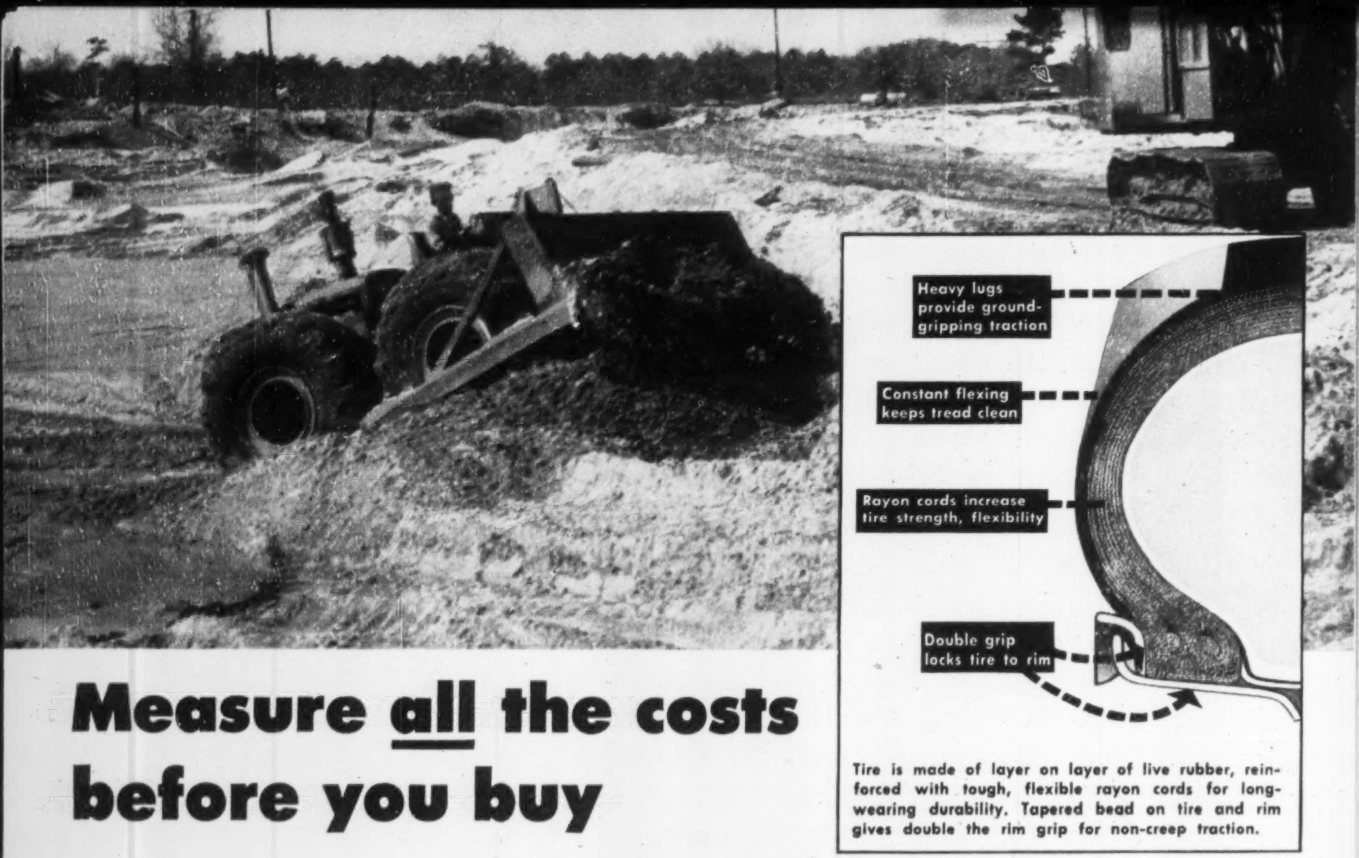
• But still no set policy—Through all these water resource questions there is evidence of change in policy. The new administration claims the hydroelectric tail is to stop wagging the reclamation dog. But there is still nothing approaching a national policy on water resource development—a policy based on sound engineering and economics that would endure changes in governmental administration.

Reports of President Truman's Water Resources Policy Commission have been filed; the new Hoover Commission's water and power task force has been set to work; the Ford Foundation's Resources of Future, Inc., has a panel of citizen water experts at work on the problem.

A determination of what functions the federal government should perform, and through what agency or agencies, eventually, must evolve. It has long been in the process of evolution. What remains to be done is for the administration to prepare a statement of policy in the form of legislation for Congress to consider.

• New role for control structures—There were few major floods last year. But there was widespread drought through the summer and fall. While constructors reveled in the favorable construction weather, water users suffered. And a little-recognized purpose

(Continued on page 105)


Heavy lugs provide ground-gripping traction
Constant flexing keeps tread clean
Rayon cords increase tire strength, flexibility
Double grip locks tire to rim

Tire is made of layer on layer of live rubber, reinforced with tough, flexible rayon cords for long-wearing durability. Tapered bead on tire and rim gives double the rim grip for non-creep traction.

Measure all the costs before you buy

Initial Costs

When you compare a Tournatractor with any big crawler-tractor, you'll find there isn't much difference in initial costs. The purchase price of the Tournatractor may be just under or just over the price of the crawler, depending on size and ply of tires used. But, with a tractor, as with many another item, "It's not the purchase price, but the upkeep!"

Maintenance Costs

The moment you watch these 2 types of tractors at work, a big difference between tire life and track life becomes evident.

In many types of soil, tires outwear tracks by as much as 2 to 1. In extremely abrasive materials, the advantage of rubber over tracks is so pronounced that most owners feel they simply can't afford the high track maintenance. In sand, for example, records show tires give as much as 4 times more service than tracks.

Dollar-wise, this often saves as much as $3 per hour of operation. During a machine's depreciation period, the elimination of high track maintenance alone can save more than the original cost of the machine.

Replacement Costs

When tracks become too worn from constant grinding in grit, they must be replaced. It's usually cheaper to buy a whole new set of track assemblies than to try to replace individual worn parts. That means paying for, and installing, some 562 wearing parts for every set of tracks.

Compared to 562 track parts, Tournatractor has only 4 tires. Replacing them when they become worn is a relatively fast, simple job. All you do is remove a few easily-accessible bolts and the wheels are off. If you've maintained proper air pressure, and have used reasonable care to avoid sharp rocks, chances are your sidewalls are still sound. Then you can simply get them *retreaded* for about half the cost of a new set of tires. Often your retreads are going strong when your neighbor is buying his *second* or even *third* new set of track assemblies! That's why owners say "for performance and profit, I'll take rubber every time."

Tournatractor—Trademark T-356-G-b

LeTourneau-Westinghouse Company

PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company of control structures was made very apparent: Storage dams eased the drought.

Control of low flows for stream pollution abatement and for the good of municipal and industrial water supply is a feature of multipurpose river projects which generally is assigned minor significance. Its true importance was emphasized last year when 75% of the Missouri River's flow at Omaha, Kansas City and other key points came from reservoir storage. Fort Peck Dam released waters of Montana spring floods to keep the Missouri safe from the standpoint of pollution. TVA, even though hard put for water and pressed for power, recognized downstream low-flow needs in its river regulation. Control structures on the Ohio River can be thanked for keeping navigation depth sufficient for coal and steel traffic. Throughout the Southwest, multi-purpose dams of the Corps of Engineers were operated to meet water supply and irrigation needs, as much as power loads would allow.

In the Southwest, particularly in Texas, future river use and control projects seem due to be planned with more emphasis on the supply phase of multipurpose projects. With an extending drought and an expanding economy, Texans are willing to spend larger sums to get more complete use of what river waters they have. Damsites are scarce in the Southwest, so when a dam is built every possible purpose should be exploited to the fullest, and entire regions—not individual cities—should benefit.

The Canadian River scheme in West Texas is the type of multi-city project the area needs. And an integrated water supply plan for the booming Gulf Coast area—presented "as an aid and stimulant" to Texans in a USBR appraisal of their water problem—might well be the type of project on which local-federal interests could agree.

• **New designs**—In the hydroelectric power field, pumped storage and reversible pump-turbine units are gaining increased acceptance. TVA has on order for its Hiwassee Dam a record-size machine. Ontario Hydro plans pumped storage on the Canadian side of Niagara Falls; and pumped storage figured in early plans for the U. S. side. At year end there was a proposal afoot for pumping Lake Erie water to storage in western New York State, using cheap off-peak power and producing more highly priced peak power on a weekly cycle. Meanwhile, in Austria, two seasonal pumped-storage systems are under construction for use of summer flows to produce winter power. One of these, the Reisseck project near the Yugoslav border, will have a 5,800-ft. head, highest of any hydro installation in the world. Water will be pumped to storage from an intermediate level.

• **New methods**—An improved means of exploring foundation material developed last year with successful field tests of a bore-hole camera at Folsom Dam in California. The device can be lowered into a 3-in. hole to record on film a series of 360-deg. views of the material under investigation. An automatically controlled flash takes care of exposure timing, and each color-film exposure covers a ¾-in. vertical section of hole.

Some major river use and control projects

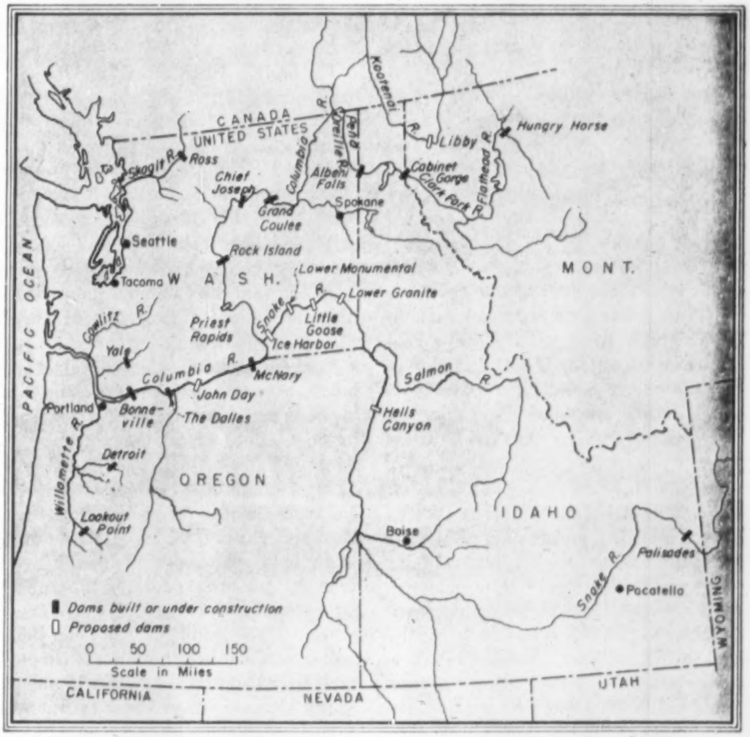
• **Columbia River**—Construction of Federal works on the Columbia River system will decline in 1954 from the peak reached in 1952 and maintained in 1953. This results from completion of such works as **Hungry Horse Dam** (fourth and last 71,250-kw generator went on the line in November) and **Detroit Dam**—coupled with the "no new starts" policy. Evidences are that local agencies will take up at least part of the slack if some of the many proposed works get under way in 1954.

The Corps of Engineers placed on the line the first 70,000-kw unit at **McNary Dam** Nov. 6, a month ahead of schedule. Unit No. 2 was put on the federal transmission system Christmas eve. This brought the $286-million project to 80% of completion with two of 14 generators installed. The pool is at full operating level for the 90-ft single-lift navigation lock and the permanent fish ladder facilities. Relocation of railroads and highways was a major phase of the past year's activity and at year end there was $224 million of the total work accomplished.

Concreting for **The Dalles Dam** spillway and powerhouse substructure started Dec. 18, a few days before the Corps of Engineers opened powerhouse Phase III bids that will make a total of $98 million in work under contract. This project is 10% along, principally excavation for dam and stilling basin under construction. About a fourth of the work is under contract.

Other major Corps of Engineers works: **Chief Joseph Dam** stood 40% complete with concreting on the main dam, slated for completion August, 1955, closed for the winter months while pouring for the powerhouse and intake structures continued. This is a $187-million project planned for completion in 1956. **Albeni Falls Dam** is 80% complete and during the year made a substantial contribution to multipurpose benefits, including an estimated 500,000,000-kwh boost to output at downstream powerhouses at Coulee and Bonneville. The project powerhouse is under roof and all exterior work is listed as complete. Re-

(*Continued on page 106*)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UNITED STATES
Kootenai R.
Columbia R.
Pend Oreille R.
Libby
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Ross
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Albeni Falls
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Grand Coulee
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Rock Island
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MONT.
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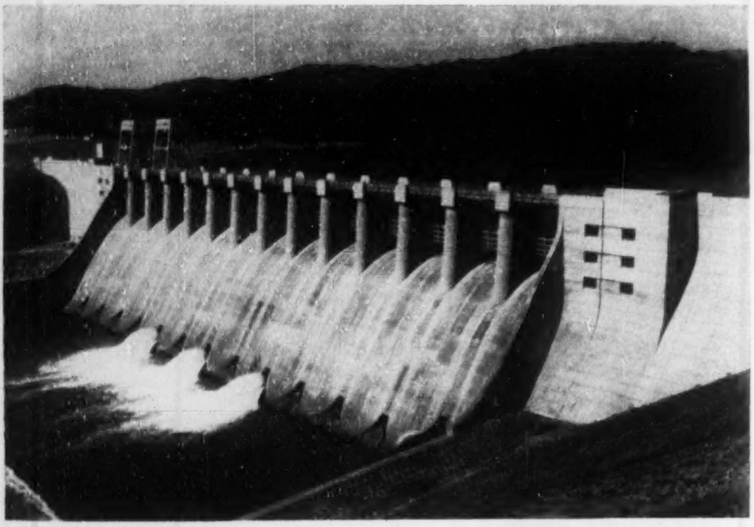
John Day
Portland
Bonneville
The Dalles
Hells Canyon
Willamette R.
Detroit
OREGON
IDAHO
Lookout Point
Boise
Palisades
Snake R.
Pocatello
Dams built or under construction
Proposed dams
0 50 100 150
Scale in Miles
WYOMING
CALIFORNIA
NEVADA
UTAH

COLUMBIA RIVER SYSTEM remains a center of major river use projects. With 30 million kilowatts of undeveloped hydro capacity, it will continue an active area.



FOR PROTECTION—Conemaugh Dam finished last year is the big reason why Pittsburgh now can develop its Golden Triangle without fear of its being flooded.

moval of the downstream cofferdam was under way at year's end. The project is slated for completion in 1956. **Lucky Peak Dam** on the Boise River in Idaho is 80% complete. The 2,400-ft long, 260-ft high embankment section was finished in December. This flood control project is planned for completion in 1955.

In the Willamette River Basin in Oregon—also Corps of Engineers work—**Big Cliff** reregulating dam for the Detroit project, dedicated in June with initial power generation, was nearing completion. Work remaining involved erection of spillway crest gates and installation of electrical and mechanical equipment in the powerhouse. Work at **Lookout Point**, scheduled for completion in 1955 was 98% complete at year's end. **Dexter** reregulating dam is about 48% complete. Contract for Dexter was last February. The Oregon dams are among 19 authorized for the river basin but Lookout Point is the last for which funds have been approved.

The only other major federal work in the Columbia Basin is the USBR's **Palisades Dam** in eastern Idaho. Included in the $77-million project is a 13,800,000-cu ~~yd earth~~fill dam—the USBR's largest. By the end of 1953, fill totaled 3,000,000 cu yd.

• **Columbia Basin Project**—The West's biggest irrigation project has passed the spectacular phase of installing high-lift pumps and storing water to expanding irrigated acreage: In 1953, water was made available to 58,445 acres, bringing the total to 131,169 acres. And in 1954, new acreage will total 54,892. Biggest contract completed in 1953 was a $3.5-million job for 17 miles of the East Low Canal. During the 1954 fiscal year, $17.7 million is being spent.

• **Elsewhere in Northwest**—In Washington, public utility districts were active in 1953. Chelan County PUD added three more 27,500-kw units to the power plants at **Rock Island Dam** on the main Columbia River under an agreement with the owner, Puget Sound Power & Light Co., completing the $33-million dam improvement project. And Pend Oreille County PUD expects to complete its $17.5-million **Box Canyon Dam** on the Pend Oreille River in 1954. The Box Canyon power plant will produce 66,000 kw during normal water periods.

The Seattle, Wash., City Light Department spent $12.5 million during 1953 on completion of its **Ross power plant** and started a $22-million receiving substation. And Washington Water Power Co. completed its $46-million **Cabinet Gorge Dam** on the Clark Fork River in 1953 and expects to undertake in 1954 a $100-million, 350,000-kw project at **Noxon Rapids** about 30 miles upstream. Cabinet Gorge is in Idaho and Noxon Rapids is in Montana.

• **Northern California**—Several public and private agencies continue development of the Sacramento-San Joaquin River systems for power, flood control and water supply. Pacific Gas & Electric Co. completed work during 1953 on the $11-million Bear River unit that includes the rockfill **Bear River Dam** and adds 29,000 kw capacity to the **Salt Springs powerhouse.** On the Pit River work is continuing on the $25.2-million **Pit 4 powerhouse** with 84,000-kw capacity, planned for completion in mid-1955. Southern California Edison Co. started work in 1953 on the $8-million **Vermilion Valley Dam** on Mono Creek, a San Joaquin River tributary. It will store 125,000 acre-ft for power generation at existing plants.

Meanwhile, work got into full swing on the $13-million **Cherry River project** near Yosemite National Park. It is a joint effort by the city of San Francisco, the Turlock and Modesto Irrigation Districts and the Corps of Engineers. A $71-million contract was awarded for the 7,500,000 cu yd earthfill **Cherry River Dam.** Site clearing and diversion tunnel contracts totalling $1.5-million are nearing completion.

The Corps of Engineers work on **Folsom Dam** on the American River near Sacramento, Calif., hit tough luck during the year through three untimely cofferdam washouts and the need for additional rock excavation when a fault was discovered well under the left abutment. But on other flood control projects in the Central Valley construction operations proceeded smoothly and two major dams were completed. By late spring work was completed—almost a year ahead of schedule—on the $21-million **Isabella Dam** on the Kern River. Except for the usual cleanup operations work was also completed on the $42-million **Pine Flat Dam** on the Kings River.

At Folsom, the Corps of Engineers and contractors announce the dam can be completed close to its early 1955 completion schedule in spite of the troubles. But the main contract sum has grown from $29.4 million to $39.4 million because of the fault trouble and increased quantities. The contract is 57% complete. During the year, five saddle dikes were completed. Earthwork on the earth wings of the main dam is well under way. These earth wings will be completed during this year.

In addition to these major dams, the Corps of Engineers is in the process of spending some $3.8 million on new levee construction and levee repair on the **Sacramento River Flood Control Project.**

Despite a drastic personnel reorganization which eliminated almost 500 positions, the U. S. Bureau of Reclamation's Sacramento Region II made steady progress on California reclamation projects through 1953.

The year saw rapid advancement on the **Nimbus Dam** and power plant downstream from Folsom Dam on the American River near Sacramento. Part of the **Central Valley Project,** the Nimbus works, are now 66% complete. The goal is to complete the $11.8-million job by next fall. USBR's **Folsom Power Plant** and switchyard is 54% complete.

The San Joaquin Valley irrigation water distribution systems stemming from the **Friant-Kern Canal** reached a 53% completion stage. The ultimate cost of the distribution works will be $41 million.

The year saw a physical start on **Monticello Dam** on Pitah Creek in **Solano** County. USBR has received from Congress 15% of the $22 million cost.

(Continued on page 109)

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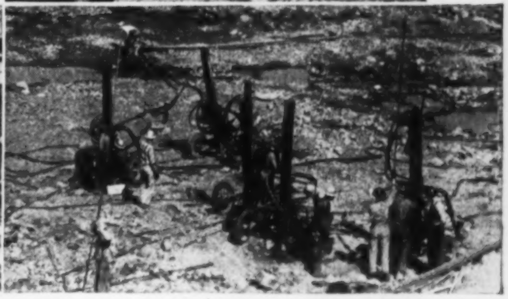

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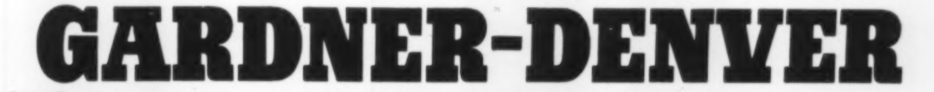
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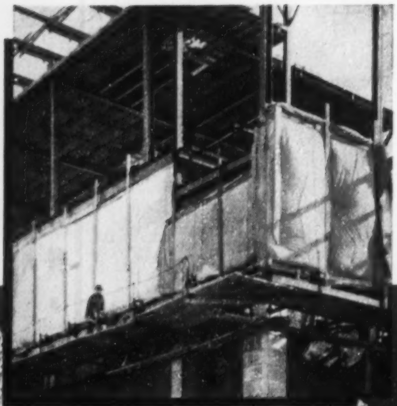

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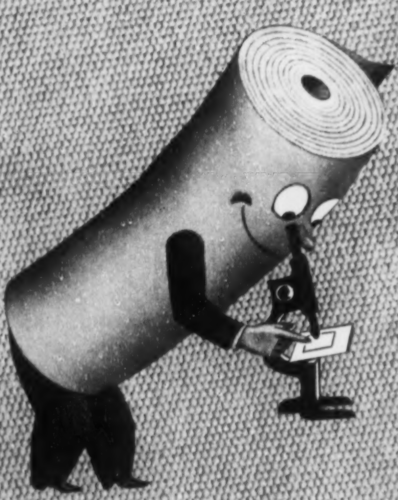

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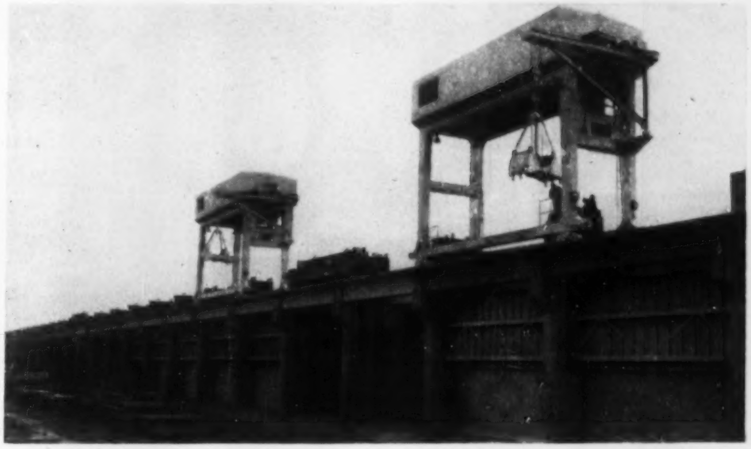


MORGANZA FLOOD GATES completed last year will pass excess flows in the Mississippi, sending them down Atchafalya Basin to the Gulf of Mexico.

• **Cachuma Project, Calif.**—USBR's work on the **Tecolote Tunnel** was set back a full year and construction costs went up about $3 million as a result of a water problem confronted in driving the tunnel unit of this project on the Santa Ynez River near Santa Barbara, Calif. A year ago the tunnel was 60% complete. Only a 3% gain was noted because of an excess flow of water in the tunnel. Water encountered was delivered for irrigation and municipal uses. New estimate of cost of the tunnel is $12.6 million.

The $14-million **Cachuma Dam** will be completed this year. The South Coast Conduit was completed during the year at a cost of $6.2 million and four regulating reservoirs, costing $3.7 million, were 95% complete. The distribution systems, ultimately to cost $4.9 million are 32% complete.

• **Owens Gorge Project**—During 1953, the last of three power plants in this $50-million development was completed by the Los Angeles Department of Water and Power. Each of the three plants, identical in design, is equipped with 37,500-kw generator for a total generating capacity of 112,500 kw. Under construction since 1949, the Owens Gorge Hydroelectric Development utilizes the 2,375-ft drop in the Owens River north of Bishop, Calif., as it flows through an 18-mile gorge. Energy generated is transmitted at 230,000 volts over a 258-mile, single-circuit aluminum conductor transmission line to Los Angeles.

• **Southern California**—Flood control work begun in 1952 under a $3.8-million project for the middle portion of the embankment on **Whittier Narrows Dam** was continued, with completion scheduled for April, 1954. A project of approximately $5 million, which will include the west portion and complete the embankment, is scheduled for advertising this month. On **Pacoima Wash**, a $1.8-million project for channel improvement (sloping cobble sides and paved floor) was completed, and a similar project for $1.7 million begun in midyear. A $1-million contract for improving 0.7 miles of the **Los Angeles River** was begun and completed by the end of the year. Another contract for approximately 1½ miles will be advertised in March. A $2.5-million channel improvement contract on the **Rio Hondo** was about 85% completed at the end of 1953. On the $7.7-million **San Antonio Dam**, contracts totaling $1.2 million were in effect at the end of the year.

• **Lower Colorado River Basin**—The final unit in Hoover Dam's power plant was authorized in 1953. The 104,500-kw generator will go in the Nevada wing and is scheduled for 1957 completion. On the **Wellton-Mohawk Canal** system, the Mohawk canal was completed last spring. Contracts have been let for the final length of the Wellton canal and for two of its distribution systems. Ultimately 75,000 acres will be irrigated by this system.

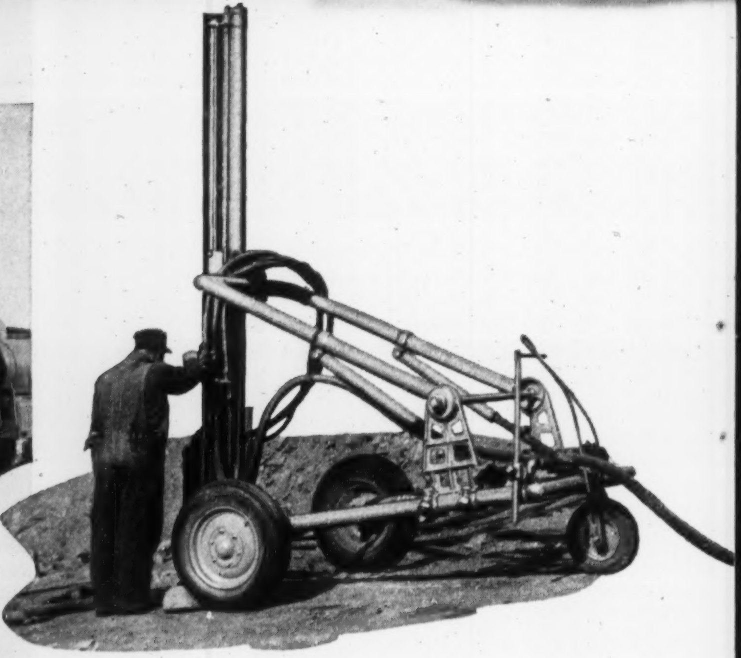
• **Utah—Duchesne Tunnel,** 6 miles long, was completed in November as the final and major part of the USBR's project to bring Provo River water to the Salt Lake area. And in Weber Basin the 3.3-mile **Gateway Tunnel** was 50% complete at the end of 1953. Work is the first part of a $70-million project that will bring new water to the Ogden area. Bids are to be called soon for the 3,100,000-cu yd earthfill **Wanship Dam** and for 225 miles of 21 to 84-in. concrete pipeline for Davis and Weber aqueduct.

• **Colorado-Big Thompson**—Three major units costing nearly $25 million, in this $164-million Bureau of Reclamation project in north central Colorado, were in their last stages of completion as 1953 ended. **Willow Creek Dam,** feeder canal and pumping plant were completed at a cost of $5.1 million. These facilities collect surplus flows in Williow Creek—a tributary of the Colorado—lift them a maximum of 172 ft and move them to Granby Reservoir. Two power plants are being completed, with a total installed capacity of nearly 100,000 kw of hydro power. **Pole Hill Power Plant** was scheduled to go into continuous service this month, with an installed capacity of 33,250 kw. It is a single unit plant operated by water diverted from the west slope of the Rockies and dropped 832 ft through a steel penstock. Total construction cost was $3.8 million. The $15-million **Flatiron Power Plant** project is scheduled to go into total service next month. Its two 31,500-kw hydro power units (plus a 13,000-hp pumping unit) are operated by water dropping 1,050 ft through two steel penstocks each a mile long. One important supply canal in the Colorado-Big Thompson is under construction and another will be started soon. The 17-mile **Boulder Creek** supply canal is 20% complete and scheduled to be finished in April, 1955, at a cost of $2.3 million. Construction of the **South Platte** supply canal—linking Boulder Creek with the South Platte River—will not start until August of this year. The $1.8-million project is scheduled for completion in June, 1956.

• **Falcon Dam**—Nearly 1,000,000 acre-ft of water has already been stored behind Falcon Dam for the irrigation of Lower Rio Grande valley lands in Mexico and the United States. Located 75 miles below Laredo, Tex., the international dam was dedicated on Oct. 19, 1953, by President Adolfo Ruiz Cortines of Mexico and President Eisenhower. Prime construction contracts were completed at the close of 1953. About $1 million worth of work remains to be done on the installation of generating and appurtenant equipment in the Mexican and U. S. power plants, each of which will have an installed generating capacity of 31,500 kw. The $49-million project, under joint construction by the Mexican and U. S. sections of the International Boundary and Water Commission, is scheduled for completion July 1.

Elsewhere on the Rio Grande, construction operations in Region 5 of the Bureau of Reclamation last year included water-salvage measures along the Rio Grande and the rehabilitation of irrigation facilities serving 7,200 acres near Maxwell, N. M. Contracts totaling about $2 million were awarded for the work last year, and and an additional $1.5 million of contracts will be let this year. Construction along the Rio Grande includes emergency channelization, of which 35 miles were completed last year; the completion of a

(Continued on page 112)



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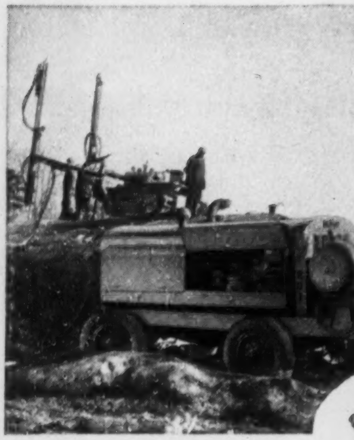

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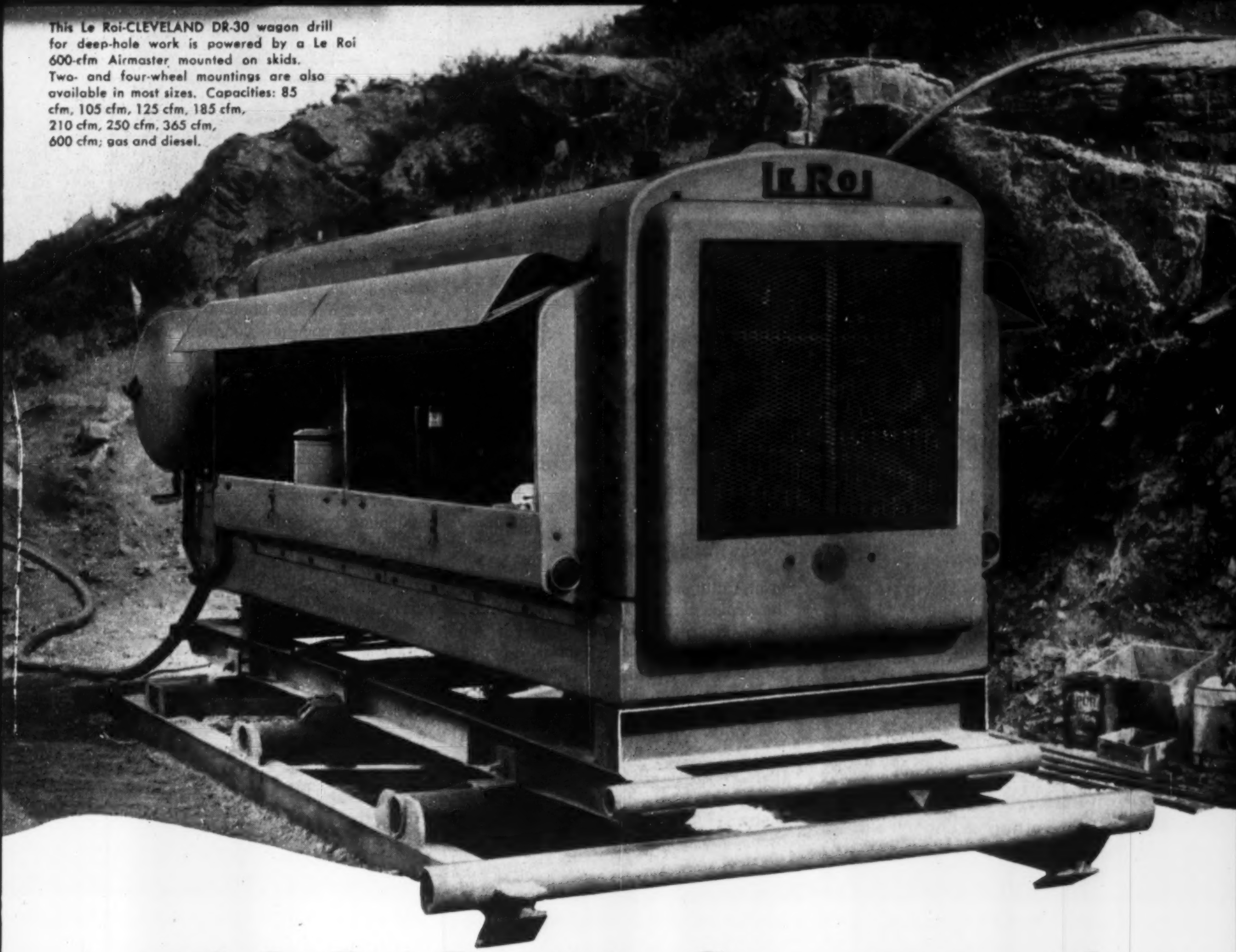

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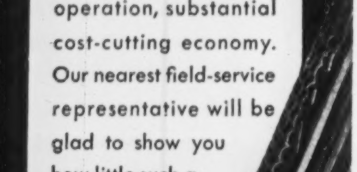

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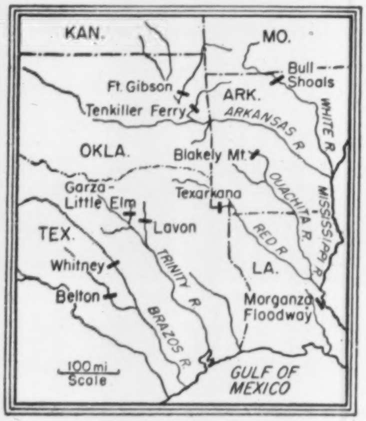

SOUTHWEST STATES saw several dams completed last year, and some still under construction on major rivers.

small treatment plant to clarify water in the depleted reservoir at Elephant Butte Dam; two detention reservoirs for the protection of 4,000 acres from flash floods; and the rehabilitation of drainage systems to conserve water. The irrigation construction near Maxwell includes the rehabilitation and enlargement of three off-stream reservoirs, now 67% finished; the construction of two diversion dams; and several canals, laterals and drainage structures. All contracts for the $1.1-million project have been awarded, and completion is scheduled for next year.

• **Southwestern states**—This promises to be a banner year for construction in the Southwestern Division of the Corps of Engineers. An estimated $62 million in new contract awards may be made this year if **Table Rock Dam** is given the go ahead signal. At present, funds appropriated for this $78.6-million project on the White River in Missouri and Arkansas are being held in abeyance pending congressional action on a report of electric power needs. Project plans call for a 1,600-ft concrete gravity section and 4,800 ft of rolled fill embankment. The reservoir would furnish 760,000 acre-ft of flood storage and 2,072,000 acre-ft of hydro power storage.

Last year $16.5 million of construction contracts were awarded for water resources projects in the eight-state division, and $31-million worth of construction was completed. Six dams were completed last year, making a total of 27 completed reservoirs with an aggregate flood control storage of 13,400,000 acre-ft. They are: **Lavon** and **Whitney** in Texas, **Fort Gibson** and **Tenkiller Ferry** in Oklahoma, **Jemez Canyon** in New Mexico, and **Bull Shoals** in Arkansas. New construction this year will center on six major floodway projects costing $49 million in federal funds, four dams costing $118 million, and bank stabilization on the Arkansas River.

First of the six major floodways to be completed is the $4.7-million **Hutchinson** Kan., floodway—to be finished early this year. The **Fort Worth** floodway, now two-thirds completed, will be finished next year. It will cost $3.9 million in federal funds, but local funds greatly exceed the federal contribution. Federal costs and status of construction of the four other projects are: **Wichita** floodway ($14.1 million) is now one-third complete and will be finished late this year. **Dallas** floodway ($10.1 million) is 12% complete and will be finished in 1957. **Oklahoma City** floodway ($11.5 million) is 5% complete; it will be finished in 1957. And work is just getting under way on the Albuquerque unit of the **Rio Grande** floodway, which will cost $5 million in federal funds, while completion is scheduled for 1957. Considerable construction will be put in place this year on two major dams in the Southwestern Divisions of the Corps of Engineers.

Belton Dam on the Leon River in central Texas is 77% complete, and will be finished this year at a project cost of $14.3 million. The 5,520-ft earth-fill embankment and 1,300-ft concrete spillway will furnish 887,000 acre-ft of flood control storage plus 125,700 acre-ft of conservation storage.

Garza-Little Elm Dam in the Upper Trinity Basin near Dallas will also be finished this year. Costing $24.7 million, the 32,900-ft embankment will store 526,700 acre-ft for flood control and 436,000 acre-ft for water conservation.

• **Missouri River Basin**—Civil works construction by the Corps of Engineers is continuing at a rate of nearly $100 million per year in this basin. Contracts awarded last year totaled $84.2 million, while $96.8 million worth of construction was completed. This year's program calls for $99.3-million worth of contracts to be awarded. At the end of 1953 about 40% of the authorized river development work of the corps in the basin was completed and an additional 39% was under construction. Total estimated cost of projects completed or under construction is $1.8 billion, while the estimated cost of the authorized corps program in the basin—exclusive of military construction—is $2.3 billion. There was considerable construction activity last year at four of the main-stem, multiple-purpose dams—Fort Randell, Garrison, Oahe and Gavins Point.

Fort Randall Dam near Lake Andes, S. D., is the farthest advanced of the four. At year's end it was 75% finished and had already impounded 1,400,000 acre-ft of water. Total storage will be 6,300,000 acre-ft. All major contracts have been let. The first 40,000-kw hydro power unit is to go on the line this month. Seven other units will follow at four-month intervals, making a planned total of 320,000 kw of installed capacity. The $198-million project, with its 10,000-ft long, 160-ft high rolled fill embankment, will be essentially finished by July, 1955, and all 8 power units are to be installed by the following summer.

Garrison Dam in North Dakota was 65% completed at the end of last year. The first of five 80,000-kw hydro power units is scheduled to go on the line next April, and all three power units in the initial power installation are scheduled to be completed by 1956. The river closure section in the two-mile, 210-ft high rolled fill embankment was accomplished last May, and impoundment of water will begin this year. The final major contract on this $305-million project—for construction of the spillway stilling basin—will be awarded this year, and work will be continued on the embankment, spillway and powerhouse.

Gavins Point Dam had a $17.5-million contract awarded last March for completion of the earthwork, spillway, powerhouse substructure and intake structure. By July of this year the $60-million project will be about 35% finished. Located on the Missouri River four miles west of Yankton, S. D., the dam's chief function will be to re-regulate large discharge flows from Fort Randall Dam, 75 miles upstream. In addition, it will have an installed generating capacity of 100,000 kw of hydro power, and will protect downstream agricultural and urban lands from flood. The 8,700-ft long, 74-ft high rolled fill embankment is scheduled for completion in November, 1955, with the first of the three 33,300-kw generators to be placed in service late in 1956.

Oahe Dam, near Pierre, S. D., is 6% finished. Two big contracts were awarded last year. One covered Stage III earthwork, and the other covered the intake and upstream tunnels. This year the Corps of Engineers expects to let a contract for construction of the downstream tunnels, control shafts and stilling basin. Estimated to cost $326 million, the project is scheduled for completion in 1961, depending upon congressional appropriations. The dam will be a rolled fill embankment 9,300 ft long and 242 ft high. Its storage capacity will be 23,600,000 acre-ft of water and the total hydro power installation will be 425,000 kw.

A second power plant is being planned at **Fort Peck Dam** on the Missouri River in northeastern Montana, with construction to begin if and when funds are provided. Adding this power plant and converting a second tunnel to power would increase the dam's present capacity of 85,000 kw to 160,000 kw. Work is at a standstill at **Tuttle Creek Dam** on the Big Blue River in Kansas because of lack of appropriations. The initial contract work, initiated in 1952 under a $5-million

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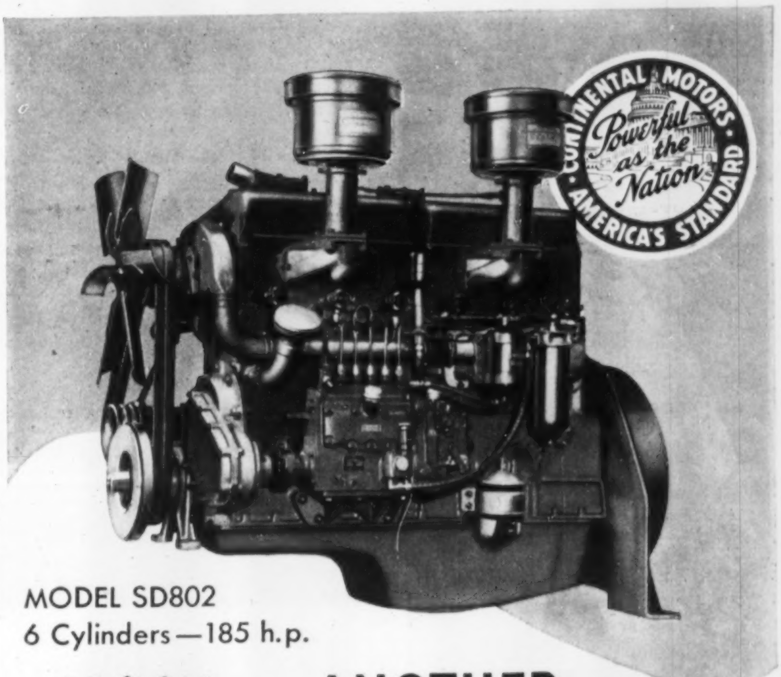

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appropriation, has been completed by the Corps of Engineers and further work is deferred pending action by Congress.

• **Bureau of Reclamation's Region 7** (Nebraska and parts of Colorado and Wyoming) placed three times as much Missouri River Basin construction under contract last year as in 1952. Construction contracts awarded in 1953 totaled $21 million, while $21.5-million worth of work was completed. This year's program calls for the awarding of $6.3 million of construction.

Trenton Dam on the Republican River in Nebraska was finished last November at a project cost of $21.6 million. Its 8,900-ft long, 144-ft high rolled fill embankment will provide 254,000 acre-ft of flood control and irrigation storage. **Webster Dam** on the South Fork of the Solomon River in Kansas is 5% complete. Initial storage in the 272,000-acre-ft multiple-purpose reservoir is scheduled to begin late in 1955, and delivery of irrigation water through works not yet started is scheduled for early 1958. Total project cost is $19.4 million. Construction of **Kirwin Dam** on the North Fork of the Solomon River is 40% finished. This $15.7-million project with 315,000 acre-ft of storage capacity for flood control, silt retention and irrigation water is scheduled to be completed in December, 1955.

Alcova Power Plant on the North Platte River in Wyoming, containing two 18,000-kw generators, is 75% finished. The $6.8-million project will be completed by August of this year. Two large irrigation projects in Region 7 of the Bureau of Reclamation include the $36.6-million **Frenchman-Cambridge Division** in southern Nebraska which is 25% finished. It will serve 68,750 acres of land. Completion of the project, exclusive of one Corps of Engineers' dam not yet started, is scheduled for 1960. The other project—**Bostwick Division** on the Republican River, serving 86,000 acres of land in Nebraska and Kansas—is about 25% finished. The $52.8 million project is scheduled for completion by 1960.

• **Bureau of Reclamation's Region 6** (the Dakotas and parts of Montana and Wyoming) will spend about $30.7 million on Missouri River Basin construction in fiscal 1954. One of the largest projects essentially completed last year is the $12.6-million **Canyon Ferry Dam** and power plant on the Missouri River near Helena, Mont. The 1,000-ft long, 172-ft high concrete gravity dam will have a storage capacity of 2,043,000 acre-ft. The first two of its three 16,667-kw generators is now in operation and the third is scheduled to go on the line about April 1 of this year.

The $12.8-million **Tiber Dam** on the Marias River in north central Montana is about one-third completed. It will be a rolled earth fill 196 ft high with a crest length of 4,300 ft plus a 17,000-ft dike section. Total storage capacity is 1,337,000 acre-ft, to irrigate 127,000 acres of dry farmland. Completion date is December, 1956. **Pactola Dam,** to furnish flood protection and a water supply for Rapid City, S. D., is about 30% finished. The $4.2-million earth rock fill structure with a 1,340-ft crest length and a height of 220 ft above streambed, will also provide a full supply of irrigation water to 2,200 acres of land and a supplemental supply to 8,900 acres.

Bids were to be received early this month for construction of the **Missouri Diversion Dam** on the Missouri River 22 miles below Fort Peck Dam. It will be a key structure in a unit of the Missouri River Basin which ultimately would supply irrigation water for 100,000 acres of land in northeastern Montana. Hydro power production is possible at the diversion dam but is not planned at this time. Total estimated cost of the diversion unit, without power facilities, is $54.2 million.

During fiscal 1954, Region 6 of the Bureau of Reclamation, will spend about $14.5 million for the construction of hydro power transmission facilities. The greater part, about $10.5 million, will be for transmission facilities in South Dakota, and $3.3 million in North Dakota.

• **Upper Mississippi**—Bids will be received early this year for the Army Engineer's new **Lock 19** at Keokuk, Iowa. The $20-million project is scheduled for completion in 1957. The **Chain of Rocks** locks and canal above St. Louis were opened to traffic in February of last year. The $40-million project—an 8-mile canal, one 110 x 1,200-ft lock and a 110 x 600-ft auxiliary—is 97% complete. A $75-million flood-protection project for 300,000 acres of land between Alton and Gale, Ill., is 60% complete.

• **St. Anthony Falls**—By completing $2.4-million worth of construction last year, the Corps of Engineers advanced its lower lock and dam project on the Upper Mississippi at Minneapolis to 58% completion. This was an increase of 26% during the year. An additional $1.9 million is scheduled to be spent this year, while the lock and dam are to be completed by August of next year. Completion date of the entire project, now 22% finished, is indefinite since no federal funds have been appropriated for the upper lock.

• **Lower Mississippi** — The $1.3-billion flood-control and river development project in the lower Mississippi basin—authorized in 1928—is 67% complete. About 1,300 miles of the 1,600-mile system of main-line Mississippi River levees have been completed to project grade and section. An estimated 450 miles of river bank sta-

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bilization is programmed on the Mississippi below Cairo and on the Ohio River below Cache River. To date, 292 miles have been stabilized by revetment, dikes and dredging, but indications are the program will require considerable expansion.

Construction contracts awarded last year by the Corps of Engineers in the Lower Mississippi River Basin below Cairo, Ill., totaled $24.9 million—a 25% reduction from 1952. An estimated $23.7-million worth of work is expected to be placed under contract by July 1 of this year. No estimates are available of the amount of contracts to be let during the last half of 1954.

At Memphis, Tenn., 610 acres of dredged fill have been completed in the $49-million **Memphis Harbor** project which will provide terminal and industrial sites on President's Island. They will have direct access to water transportation by a 12-ft deep, 300-ft wide dredged harbor channel. The **Morganza Floodway,** about 25 miles north of Baton Rouge, La., is essentially complete. It will pass floodwaters from the Mississippi into the Atchafalya Basin and on to the Gulf of Mexico. Within the basin, 403 of the 448 miles of levee construction have been constructed to project grade, but because of continued consolidation of foundation and embankment several miles of levees will require additional lift. **Bayou Sorrel** and **Berwick** locks are finished and **Bayou Boeuf** lock, located two miles southwest of Morgan City, is essentially complete.

Blakely Mountain Dam in Arkansas is on schedule and $29.3 million has been appropriated to date for its construction. The $31-million project on the Ouachita River will have 2,768,000 acre-ft of gross storage for flood control and 75,000 kw of hydro capacity. A total of $24.3 million has been appropriated for **Texarkana Dam** on the Sulphur River in Arkansas; the $33-million project has been under construction for the last three years. Planning is starting on the $20.1-million **Ferrells Bridge Dam** for flood control on Cypress Creek, a tributary of the Red River.

- **Florida flood control**—During 1953 the Corps of Engineers continued work on the authorized first phase of a comprehensive plan for flood control and other purposes in central and southern Florida. Estimated cost of the total plan at time of authorization of the first phase in 1948 was just over $208 million. Current total estimate of the part at present authorized is $111.7 million, of which local interests represented by the Central and Southern Florida Flood Control District pay 15% of construction costs—leaving the federal share of the project at $96.3 million. Completed during 1953 were 21 miles of canals, one salinity control structure, and 27 miles of internal levees. Four major water con-

(Continued on page 116)

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trol pumping stations and spillways were 5 to 99% completed. At year end the project was 16% completed at a cost of about $15.2 million of the $18.8-million worth of federal funds appropriated to date. During the second half of fiscal year 1954, plans provide for construction of the remainder—or east part—of Middle River Canal and one railroad bridge. Plans are not formulated beyond the end of this calendar year since appropriations for fiscal year 1955 are not known.

• **Roanoke Rapids**—Virginia Electric & Power Co., having won its struggle with the Department of the Interior for the right to develop the power potential of Roanoke Rapids, began excavation last year. The rapids are in North Carolina, near the Virginia line, on the Roanoke River. VEPCO will build a concrete gravity dam 2,965 ft long. Four power units will develop 111,200 kva of capacity. The $30 million project is planned for completion in early 1956.

• **Roanoke River—John H. Kerr Dam** (formerly called Buggs Island) had its seventh power unit put into commercial operation in December by the Corps of Engineers. Farther up in the basin on Smith River, the $13-million **Philpott Dam** project was practically completed last October when the second of two power units went on the line.

• **Aluminum Company dams**—High in the Smokies of western North Carolina Nantahala Power and Light Co. (an Alcoa subsidiary) has two relatively small power projects under construction. Both involve rockfill structures. **Bear Creek** development is 85% complete and expected to begin producing power (10,000-kva) next month. **Tennessee Creek** project, two reservoirs feeding a single tunnel to a 12,000-kva plant, is 35% complete and expected to operate by the end of this year.

• **Tennessee Valley**—TVA's 20th dam—**Ft. Patrick Henry**—was closed last October; its two 18,000-kw hydro units are completed. The 95-ft high, 740-ft long concrete gravity dam is on the South Fork of the Holston River near Kingsport in northeast Tennessee. At completed **Boone Dam**, 10 miles upstream, three 25,000-kw units were all in operation by last September.

Continuing its process of filling empty hydro stalls still existing at tributary river projects, TVA during 1953 completed two 30,000-kw units at **Cherokee Dam**, for a total of 120,000 kw there. The fourth and last unit at **Douglas Dam** is under construction and will enlarge the total plant to 112,000 kw by July. A third and final 67,500-kw unit at the foot of 480-ft **Fontana Dam** was practically ready to start turning at the end of the year. Single unit plants of 10,000 and 15,000-kw capacity are under construction at **Chatuge** and **Notterly** dams, respectively. Both these Smoky Mountain dams were built initially with no power facilities installed.

Hiwassee Dam in the southeast corner of North Carolina is to have a reversible unit installed, a pump-turbine with 59,500-kw capacity as a turbine and capacity of 3,900 cfs against a head of 205 ft as a pump. This unit is now being manufactured and is due to be installed and in operation late next year.

• **Southeast**—Three Corps of Engineer projects in Alabama, Georgia and Florida were pushed along toward completion during 1953.

Demopolis Lock and Dam went from 25% to 66% completion on the Tombigbee River 218 miles north of Mobile, Ala. This $20.4-million project includes a 110x600-ft lock with 40-ft lift. Lock excavation and concreting was done last year; the single contract for lock, dam and appurtenances continues with the lock expected to be in use by late summer.

Jim Woodruff lock, dam and powerhouse on the Fla.-Ga. state line is a $46.4-million project now 71% finished; it is on the Appalachicola River where it is formed by the Flint and Chattahoochie. During 1953 the first stage of gated spillway construction was nearly completed. In 1954, this section of the concrete dam will be continued and the powerhouse for three 10,000-kw units will be started. River closure is scheduled for early in the year, after which navigation will be passed through the completed lock.

Buford Dam on the Chattahoochie 35 miles northeast of Atlanta, Ga., is now 16% finished. Work on the $42-million project during 1953 centered about forebays, tunnels and tailrace for the 46,000-kw power plant. Contract for the main dam, a 192-ft high earth structure, is scheduled to be let this spring.

• **Ohio River Basin**—Civil works construction contracts completed during 1953 by the Ohio River Division, Corps of Engineers, totaled $27.8 million, and $7.3-million of contracts were let. The division now intends to let some $15.3-million worth of work during the first six months of this year.

Conemaugh Dam was finished last year for flood control on the Conemaugh River 42 miles east of Pittsburgh, Pa. The $46.2-million project is a key to the redevelopment under way on Pittsburgh's Golden Triangle, once a victim of recurrent floods. The 137-ft high, 1,256-ft long concrete gravity dam has 270,000 acre-ft behind it for storage of flood flows. At **Dale Hollow Dam** on the Obey River near the Tennessee-Kentucky line, the third and final 18,000-kw hydro unit was installed and put on the line in December. This $26-million

(*Continued on page 121*)

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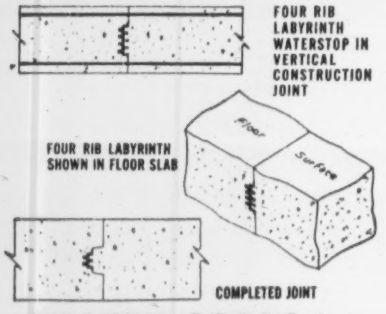
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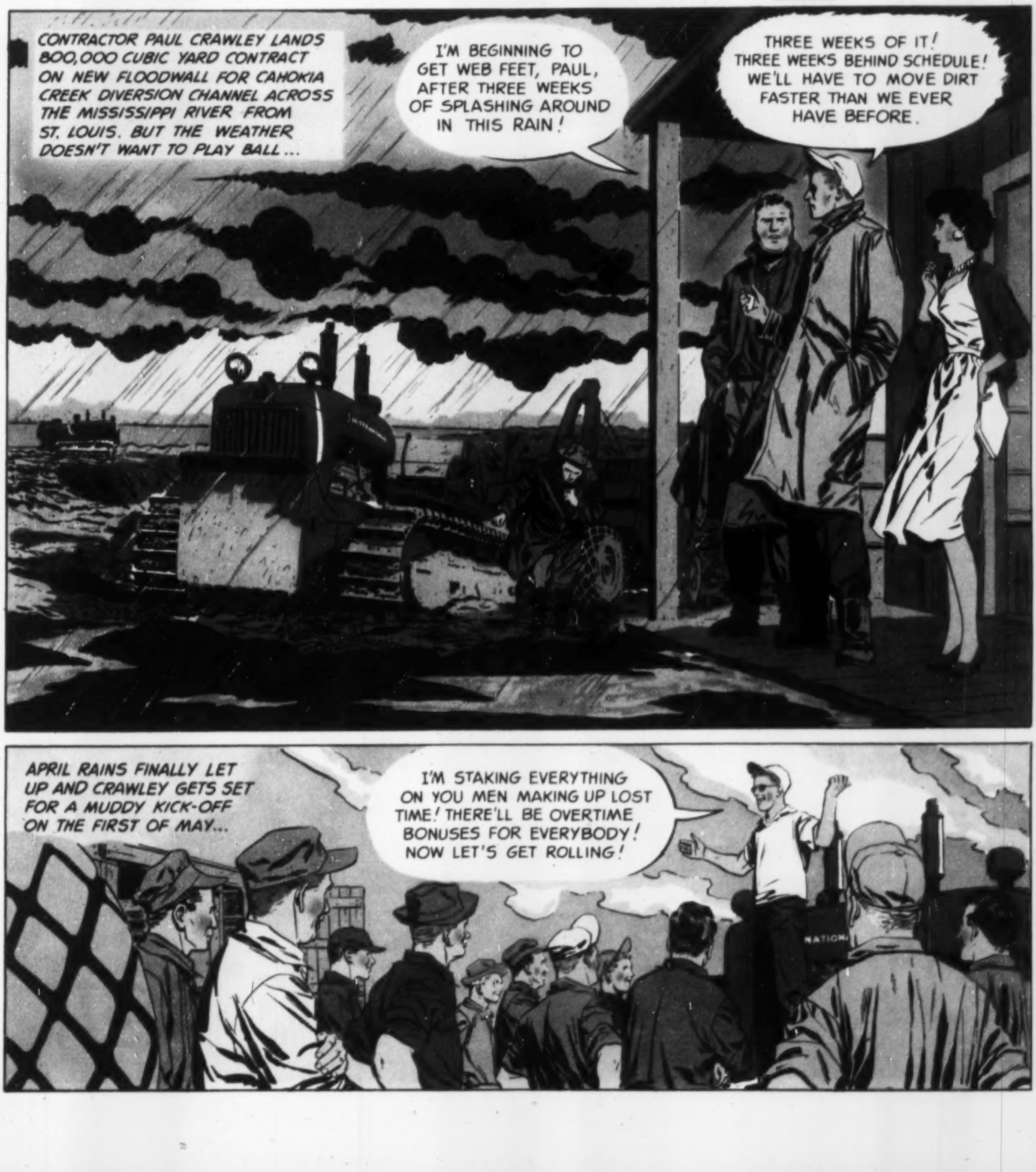
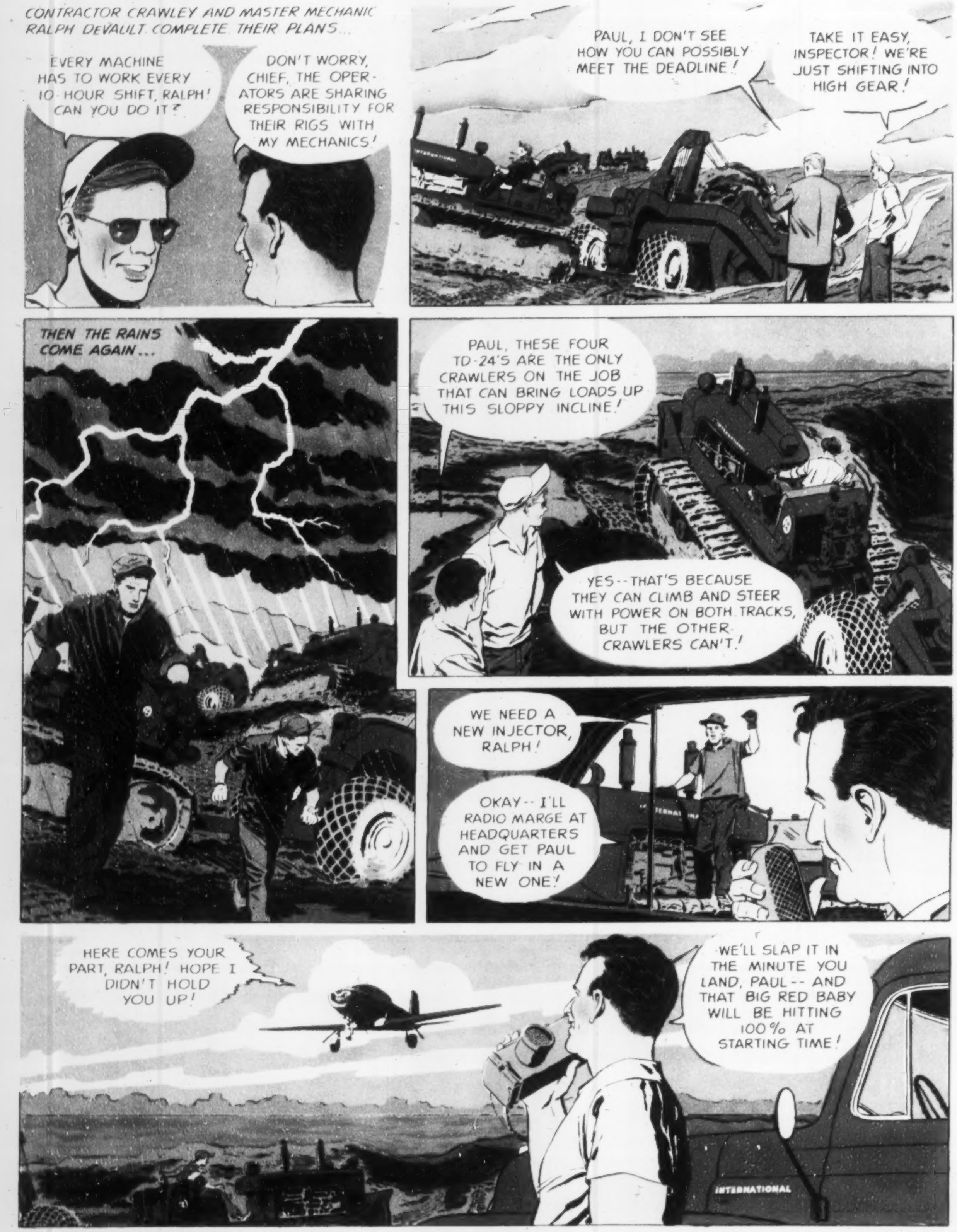
An Actual Job Report from IH


CONTRACTOR PAUL CRAWLEY LANDS 800,000 CUBIC YARD CONTRACT ON NEW FLOODWALL FOR CAHOKIA CREEK DIVERSION CHANNEL ACROSS THE MISSISSIPPI RIVER FROM ST. LOUIS. BUT THE WEATHER DOESN'T WANT TO PLAY BALL...
I'M BEGINNING TO GET WEB FEET, PAUL, AFTER THREE WEEKS OF SPLASHING AROUND IN THIS RAIN!
THREE WEEKS OF IT! THREE WEEKS BEHIND SCHEDULE! WE'LL HAVE TO MOVE DIRT FASTER THAN WE EVER HAVE BEFORE.
APRIL RAINS FINALLY LET UP AND CRAWLEY GETS SET FOR A MUDDY KICK-OFF ON THE FIRST OF MAY...
I'M STAKING EVERYTHING ON YOU MEN MAKING UP LOST TIME! THERE'LL BE OVERTIME BONUSES FOR EVERYBODY! NOW LET'S GET ROLLING!
NATIONA


CONTRACTOR CRAWLEY AND MASTER MECHANIC RALPH DEVAULT COMPLETE THEIR PLANS...
EVERY MACHINE HAS TO WORK EVERY 10-HOUR SHIFT, RALPH! CAN YOU DO IT?
DON'T WORRY, CHIEF, THE OPERATORS ARE SHARING RESPONSIBILITY FOR THEIR RIGS WITH MY MECHANICS!
PAUL, I DON'T SEE HOW YOU CAN POSSIBLY MEET THE DEADLINE!
TAKE IT EASY, INSPECTOR! WE'RE JUST SHIFTING INTO HIGH GEAR!
INTERNATIONAL
THEN THE RAINS COME AGAIN...
PAUL, THESE FOUR TD-24'S ARE THE ONLY CRAWLERS ON THE JOB THAT CAN BRING LOADS UP THIS SLOPPY INCLINE!
YES--THAT'S BECAUSE THEY CAN CLIMB AND STEER WITH POWER ON BOTH TRACKS, BUT THE OTHER CRAWLERS CAN'T!
WE NEED A NEW INJECTOR, RALPH!
OKAY-- I'LL RADIO MARGE AT HEADQUARTERS AND GET PAUL TO FLY IN A NEW ONE!
INTERNATIONAL
HERE COMES YOUR PART, RALPH! HOPE I DIDN'T HOLD YOU UP!
WE'LL SLAP IT IN THE MINUTE YOU LAND, PAUL-- AND THAT BIG RED BABY WILL BE HITTING 100% AT STARTING TIME!
INTERNATIONAL

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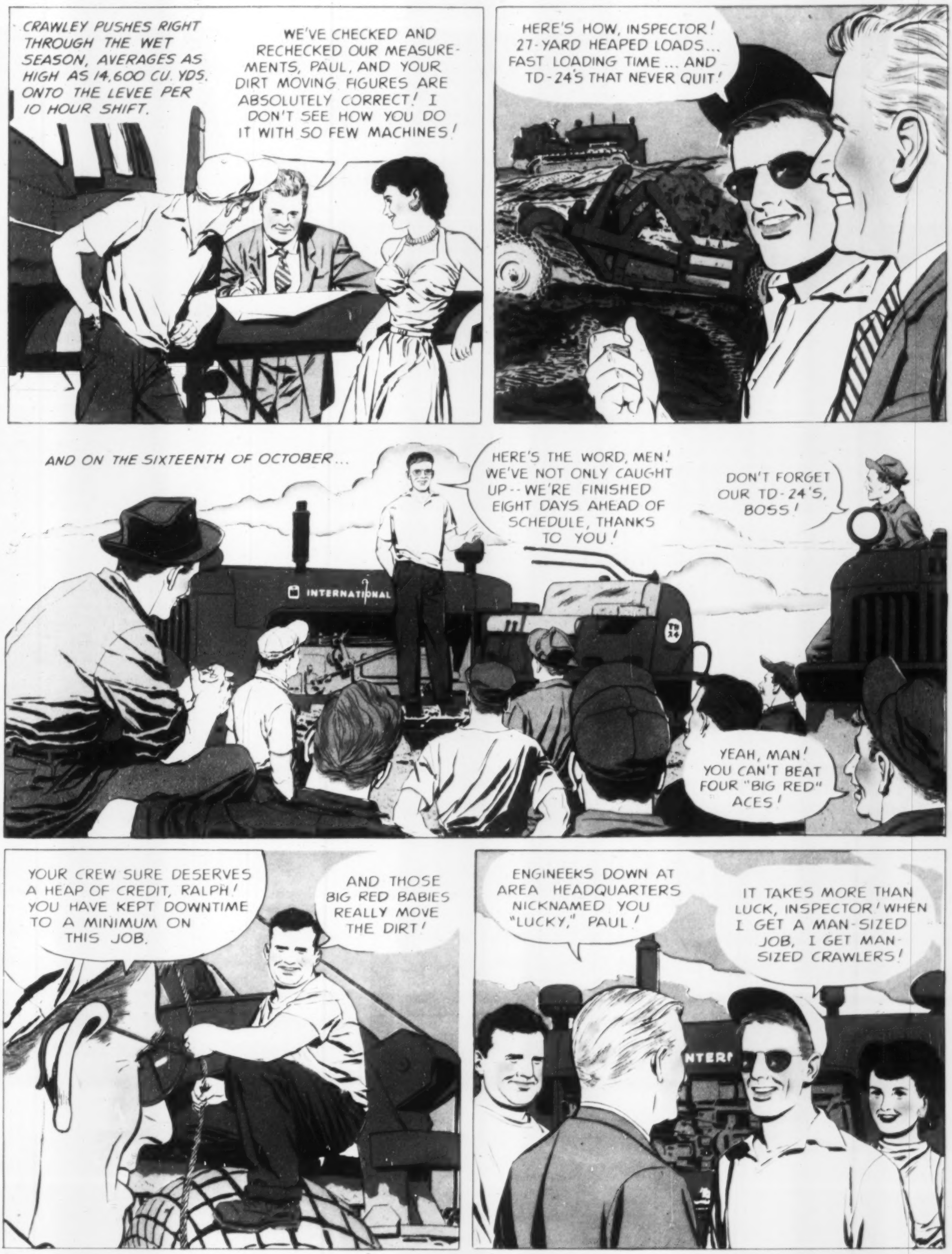
CRAWLEY PUSHES RIGHT THROUGH THE WET SEASON, AVERAGES AS HIGH AS 14,600 CU. YDS. ONTO THE LEVEE PER 10 HOUR SHIFT.
WE'VE CHECKED AND RECHECKED OUR MEASUREMENTS, PAUL, AND YOUR DIRT MOVING FIGURES ARE ABSOLUTELY CORRECT! I DON'T SEE HOW YOU DO IT WITH SO FEW MACHINES!
HERE'S HOW, INSPECTOR! 27-YARD HEAPED LOADS... FAST LOADING TIME ... AND TD-24'S THAT NEVER QUIT!
AND ON THE SIXTEENTH OF OCTOBER...
HERE'S THE WORD, MEN! WE'VE NOT ONLY CAUGHT UP--WE'RE FINISHED EIGHT DAYS AHEAD OF SCHEDULE, THANKS TO YOU!
DON'T FORGET OUR TD-24'S, BOSS!
INTERNATIONAL
YEAH, MAN! YOU CAN'T BEAT FOUR "BIG RED" ACES!
YOUR CREW SURE DESERVES A HEAP OF CREDIT, RALPH! YOU HAVE KEPT DOWNTIME TO A MINIMUM ON THIS JOB.
AND THOSE BIG RED BABIES REALLY MOVE THE DIRT!
ENGINEERS DOWN AT AREA HEADQUARTERS NICKNAMED YOU "LUCKY," PAUL!
IT TAKES MORE THAN LUCK, INSPECTOR! WHEN I GET A MAN-SIZED JOB, I GET MAN-SIZED CRAWLERS!

Meet the man they call "LUCKY"

Here's Paul Crawley, 32-year-old contractor from Edwardsville, Illinois and Clayton, Missouri. He currently (October, 1953) is working on five major levee contracts with the U. S. Army Corps of Engineers, totalling approximately 2,900,000 yards of dirt and $1,300,000.

Paul says, "Yes, I know they call me 'Lucky', but you need more than luck to make up nine weeks lost by rain and floods! We made up that time in a little more than three months. We did it with a team of top operators and mechanics who used the right equipment for the job we had to get done.

"My four TD-24 tractors showed their true worth when they kept right on working in the rain, climbing slippery levee slopes with heaping scraper loads . . . a job that caused our other tractors so much trouble we had to use them elsewhere. In one clocked 13-day period, we moved 197,700 cubic yards of dirt. TD-24 performance was a tremendous factor in helping us set this record."

By using the best in earthmoving equipment, by hedge-hopping in his two planes and by using a powerful FM radio with two-way phones in all his superintendents trucks, Paul not only kept this project rolling —he made the dirt fly on four other levee jobs at the same time!

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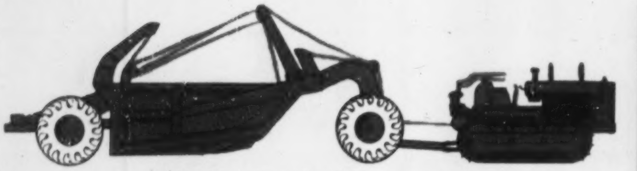
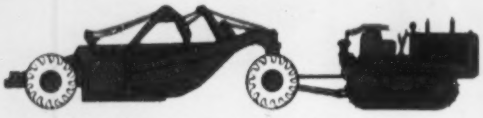
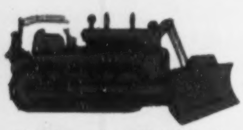


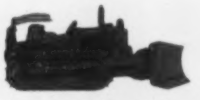
TD-24 crawler with matched scrapers



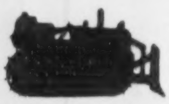
TD-18A crawler with matched scrapers



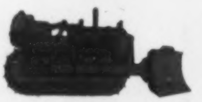
TD-24 crawler with bullgrader



TD-14A crawler with cable bullgrader

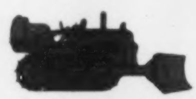


TD-9 crawler with hydraulic bulldozer

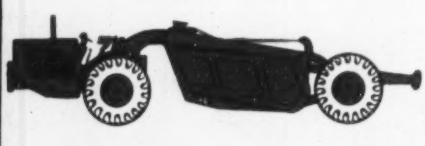


T-9 crawler with hydraulic bullgrader

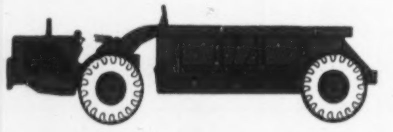
TD-6 crawler with hydraulic bulldozer



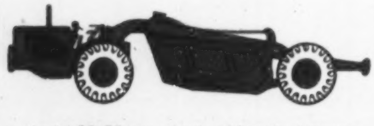
T-6 crawler with hydraulic bullgrader



Model 2T-75 two-wheel, rubber-tired tractor with 18 heaped-yard capacity scraper



Model 2T-75 two-wheel, rubber-tired tractor with 20 heaped-yard capacity bottom dump wagon



Model 2T-55 two-wheel, rubber-tired tractor with 13 heaped-yard capacity scraper project—part of the Cumberland River Basin development, has a gated concrete structure, 185 ft high.

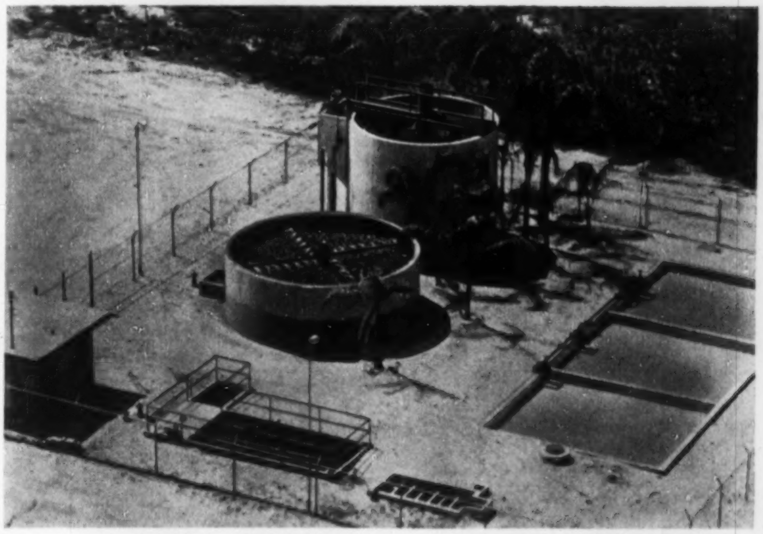
Old Hickory Lock and Dam is 40% completed on the Cumberland River 23 miles upstream (east) from Nashville, Tenn. This $53.2-million project will have a 60-ft lift in its 80x400-ft lock and will supplant smaller existing locks on the river. In addition it will feed four 25,000-kw power units below its 98-ft high concrete gravity and rolled earth dam. The powerhouse section is to be constructed this year. **Cheatham Lock and Dam** is 40% finished on the Cumberland, 42 river miles below Nashville. The lock with 110x800-ft chamber and 30-ft lift is in use; three 12,000-kw power units will be built. Cost will total $32.2 million. The concrete gravity dam is 75 ft high and 495 ft long, exclusive of lock and power plant. On the Monongahela River, 11 miles upstream from Pittsburgh, **Lock No. 2** was completed last November. It is a 110x720-ft chamber, with a 56x360-ft auxiliary completed earlier. Total cost: $17.2 millions.

Levee projects along the Ohio River include $29.3-million worth of work at **Louisville, Ky.**, now 73% done. It involves 12.8 miles of levee, 4.5 miles of concrete wall and 14 pumping stations. For full protection by 1955, local interests are paying $2.5 million of the cost. **Covington, Ky.**, opposite Cincinnati, has an $8.5-million project 77% complete. It will have two miles of levee, 0.9 miles of wall and 10 pumping stations. A $7.2-million levee and floodwall project at **Maysville, Ky.**, is 48% completed. **New Albany, Ind.**, saw a $6.2-million project completed in 1953, except for three pumping plants scheduled for completion this summer. At **Vincennes, Ind.**, $4.5-million worth of flood control work is 26% completed. And at **Ashland, Ky.**, a $3.7-million project was completed at year end.

• **Raquette River dams, N. Y.**—Niagara Mohawk Power Co is in the midst of a seven-year program to develop upstream power on the Raquette, which tumbles northwestward out of the Adirondacks to St. Lawrence River. **Carry Falls Dam,** the principal storage structure began regulating flow for existing hydro plants last year. Five more dams, with generating capacity totaling 112,500 kva, will begin coming on the line this year, with the final one scheduled for mid-1957. The first three, **South Colton, Five Falls** and **Rainbow Falls**, now are under construction.

• **Connecticut power**—On the Housatonic River northeast of Danbury, Connecticut Light & Power Co. has a 100-ft high, 1,400-ft long concrete dam under construction. A power plant with capacity of 37,250 kw is to be on the line there next year.

BRIEFS from "THE YEOMANS GUARD"



Yeomans-developed "package" sewage treatment system at Garden Manor, Florida—part of unique pay-as-you-go sanitary system.

Garden Manor, Florida—

ANOTHER YEOMANS SOLUTION TO SMALL-COMMUNITY SANITATION PROBLEMS

Sanitary needs of the small community are no longer of interest only to health officials and sanitary engineers . . . as shown by the following facts concerning the new Yeomans-developed sewage treatment system at Garden Manor Subdivision, St. Petersburg, Florida:

When the developers of Garden Manor Subdivision offered a complete sanitary system as part of their 800-lot development, home buyers gladly paid premium prices for lots, and agreed to a 20-year tax levy to pay for operation and maintenance of the sanitary system by the city of St. Petersburg.

When the pay-as-you-go financing employed at Garden Manor was featured in a recent issue of the Yeomans periodical, "The Yeomans Guard," readers across the country demonstrated as much interest in the "package" plant itself as in the unusual financing.

IN THE PUBLIC EYE . . . AND WHY

This growing interest of the general public in small community sanitation needs, as indicated in the case of Garden Manor, stems mainly, we believe, from these factors:

1. Steady decentralization of housing and industry, with resulting use of land that is remote from existing sewage treatment systems. 2. Increasing disfavor with which health officials view unsanitary septic tanks. 3. Increasing public and industrial demand for protection of the economic and recreational values of our streams.

THE YEOMANS APPROACH TO THE PROBLEM

The Garden Manor sewage treatment system is one of a series of treatment systems developed by Yeomans to meet the health requirements of all communities in the 50 to 2500 population range; and, at the same time, to be flexible enough to permit specific "tailoring" for the specific requirements of the community to be served.

Each system in the Yeomans small-community series is a "package" in terms of compactness and one-source responsibility. Yeomans "package" sewage treatment systems are not "off-the-shelf" systems as regards size, equipment or operation; nor is a Yeomans "package" system a scaled-down version of a larger one.

The series includes "package" systems for either primary treatment or complete treatment.

The unvarying success of these "packages" is a direct result of the Yeomans determination to develop sewage treatment systems that meet local health requirements as well as the following basic needs common to practically all small communities, new subdivisions, isolated schools, institutions and industrial plants:

- ECONOMY
- COMPACTNESS and ATTRACTIVENESS
- TAILORED FOR THE JOB
- SIMPLE MAINTENANCE
- GUARANTEED SATISFACTION

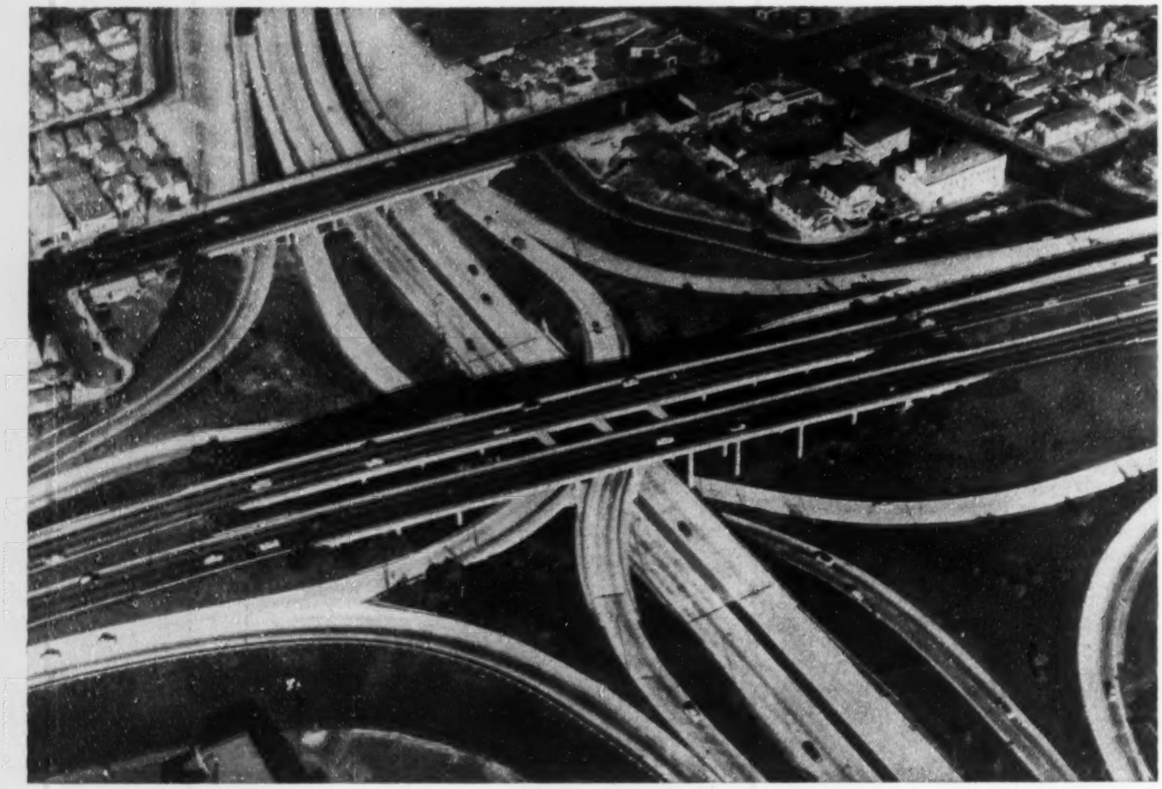
The full Garden Manor treatment system and financing story is covered in the current issue of "The Yeomans Guard," and complete information on Yeomans "Package" Sewage Treatment Systems is given in a new bulletin. Copies of each, as well as help on specific small-community treatment problems are available on request.

YEOMANS
BROTHERS COMPANY
1999-9 NORTH RUBY STREET
MELROSE PARK (CHICAGO), ILLINOIS

☐ Please send "The Yeomans Guard"

☐ Please send "Package" System Bulletin

My name, firm and address are as follows:



MORE COMPLEX THAN MOST, this interchange nevertheless is symbolic of design and construction problems imposed on highway engineers by today's traffic growth. Carrying roadways at four levels, it is the meeting point of four Los Angeles freeways.

Techniques and trends . . .

Transportation

Pressure from vehicular traffic continued to be the primary stimulus to construction in the transportation field during 1953. Popular opinion swung belatedly nearer to an appreciation of the need for more public road money, but the disparity kept on widening between existing highway facilities and a system that could be called adequate.

One bright spot in the year's highway picture was a phenomenal increase in toll-road projects. Almost $1.5-billion worth of turnpikes was under construction at the end of the year. This was more than double the $0.7-billion worth already in service, and it was only slightly less than the total amount of free road and bridge contract money budgeted by states for 1953.

A look into the future indicates that the peak rate of toll-road construction is being reached, and that 1954 will be a year of leveling-off. Free-road construction will have to take an increasing share of the needed growth.

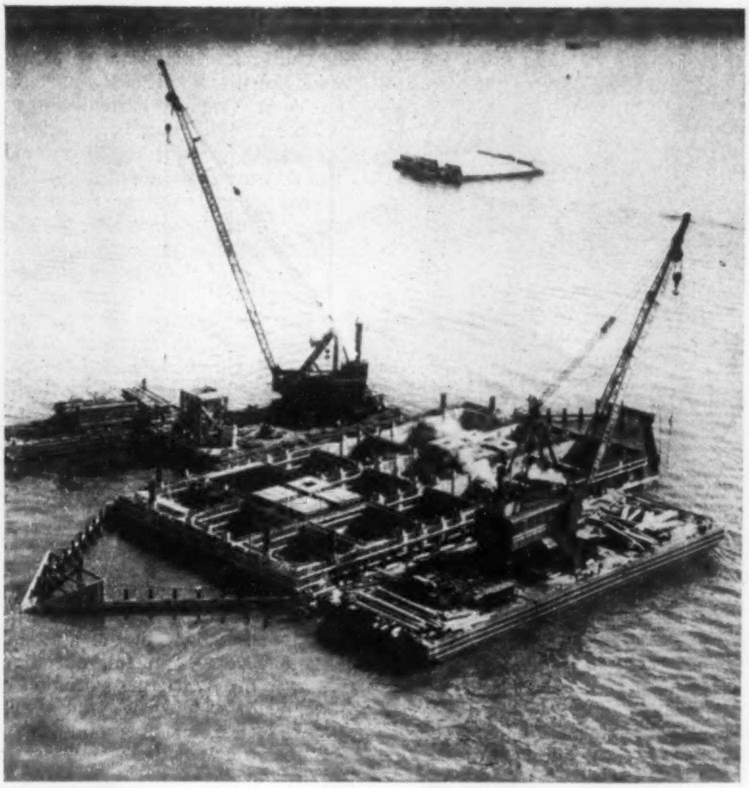
Fortunately, there are indications that free-road work will step up, despite the fact that the 1953 budgets for state highway departments were only 3% over those departments' 1952 commitments. This slight rise reflected an increase in federal-aid money to $575 million annually, which became available July 1. It also reflected spotty response by legislatures to the need for better highways. Now, state highway officials are seeking a federal-aid increase to $900 million. This figure is more in line with their estimates that road construction will have to proceed at twice its present rate in order to close the gap between today's facilities and traffic demands.

• **Toll roads a stop-gap**—Closure of the gap is being helped by toll roads, to be sure. Current and near-future expenditures on turnpikes prove this. But toll roads are only a partial stop-gap. Add 1,000 miles to the 2,000 miles already built or under construction, and you have the cream of toll road locations—the projects where private investors feel their funds are safe. This is only a billion-odd dollars out of the $35 billion that highway officials say should be spent to make the federal-aid system adequate. Some form of federal aid to toll roads could extend such projects economically another thousand or even two thousand miles.

• **Turnpike deaths**—During 1953 the accident death rate on turnpikes remained under scrutiny. Despite the fact that death has lurked on all highways for many years, toll roads have become the spectacular offenders. This is not because their fatality rate was higher than national averages but because more safety was supposed to have been built into those highways.

The most logical reason for turnpike accident severity has seemed to be the high speed that is allowed and maintained. Speed, indeed, is a principal attraction to revenue-paying traffic, and for that reason the authorities hesitate to reduce limits until they are sure there is no other way of reducing fatal accidents.

Seeking evidence that might either indict or exonerate high speed, the Pennsylvania Turnpike Commission last year reduced speed limits on the western half of its turnpike, while leav-



TOLL ROADS worth $1.5 billion were under way in 1953. Longest was New York Thruway, whose bridge across the Hudson River will have semi-floating foundations.

ing the maximum passenger-car speed on the eastern half at 70 mph. No results have been announced as to what the comparison is showing.

Meanwhile, however, the New Jersey Turnpike Authority reported the heartening news that deaths had dropped from 47 in 1952 to 36 in 1953 despite a 20% increase in traffic. Turnpike police attribute the reduction to strict enforcement of existing traffic regulations. Motorists appreciate safety crusades, but safety-mindedness is only a minor help, according to the police. "All they really understand is enforcement."

New Jersey Turnpike police use a variety of modern devices for enforcing traffic regulations, including two-way radio at toll stations, portable radar equipment and radio patrol cars that look like private sedans.

• **Complex toll collection**—Another turnpike problem received some attention during the year—but it was not a new one. Toll collection, historically a gnawing worry to toll structure operators because of temptations for collectors to cheat, promised to be the most complex yet on the New York Thruway. When a portion of that route opens this year motorists will be able to pay tolls in three different ways. First, there will be the cash-fare ticket; then there will be charge accounts for commercial operators. Both of these payment methods are used on other toll roads. But there will be also a flat-rate annual permit for New York-registered passenger cars. Moreover the Empire State's toll road will have more toll-collection interchanges than any previous route. Precautions against cheating have gone so far as to include a camera that can photograph every transaction and vehicle as it passes through a gate. The complexity of this toll collection and surveillance system has caused some engineers to wonder if there is not a point of diminishing returns in collection costs.

• **Semi-free roads**—Meanwhile, other observers thought they spotted a trend away from the fully enclosed turnpike. In Virginia a proposed toll road would be integrated with arterial routes in Richmond and Petersburg, where local traffic would not be subject to tolls. Beyond the proposal stage is a free section of the New York Thruway in Buffalo on which a substantial volume of local traffic will travel, and modifications of the idea are found on a portion of New Jersey's Garden State Parkway and at Manchester, N. H., on a turnpike being built from the Massachusetts line northward to Concord. The combined toll and free road appears to be the first step toward making more effective use of toll roads in the nation's highway system.

Virginia also was the state where a move in the opposite direction was curbed during the year. There, two private toll-road companies had been chartered. But refusal by the state to buy stock in the companies removed a financial crutch that they had hoped for, and probably set a precedent that has discouraged private toll-road companies in other states.

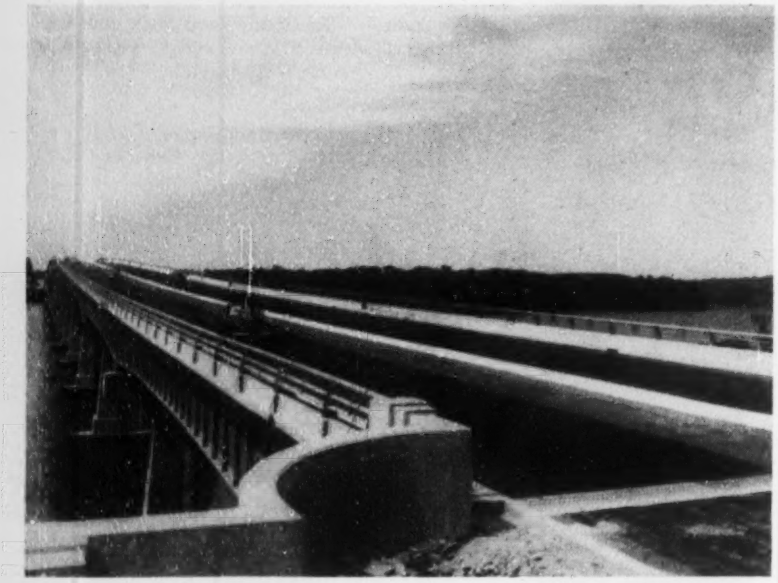
• **Interstate System looking up**—The trend toward integration of turnpikes with free roads came at a particularly appropriate time, because there is a possibility that the Interstate System, established as an idea in 1944, will get increased attention shortly. The American Association of State Highway Officials has been urging a special federal effort on these roads. AASHO made its point in a small way last year, when Congress gave the Interstate System $25 million above the $550 million for regular federal aid, but now the association asks $250 million for fiscal 1956 and 1957. This amount, to be distributed by a 75% federal-25% state formula, would be part of the $900-million annual federal aid appropriation requested.

• **Gas tax flurry**—Such an increase obviously calls for more matching funds from the states, and it was toward this objective that the Governors' Conference last year aimed a resolution asking the federal government to eliminate its gasoline tax. States then could tack the amount of the federal tax onto their own gasoline taxes, thus increasing their road funds painlessly—but not for motorists.

This proposal caused a flurry of re-examination in the field of gas-taxation philosophy. Observers believe that such a move would disrupt highway programs at a critical time, and the AASHO reversed its 20-year stand against the federal tax. This tax, incidentally, brings the government about $1 billion annually—still somewhat more than the amount recommended for federal aid. Other taxes on vehicles add a second billion to the government's take. The AASHO reversal is in line with its urging that the government return all federal gas-tax money to the states as road aid.

Gasoline tax diversion by the states continued to wane in importance, with the result that many states will have to tap other income sources to meet the highway emergency—or increase their gasoline taxes. There is evidence that at least some states feel that the point of diminishing gas tax returns has not

(Continued on page 124)



SEVERN RIVER BRIDGE, opened in 1953 enables traffic using Chesapeake Bay Bridge to bypass narrow streets of historic Annapolis, Md.

been reached yet, because New York is proposing to add two cents to its tax this year, and California raised its tax in 1953. The additional tax money will put California in a better position to catch up with its highway needs, but engineers there say it still looks like a losing battle. The California increase has been reflected in roadwork scheduling, some projects originally slated for 1955 now being initiated in 1954.

• **Industry does its part**—Ideas for other improvements in free-road policy came from industry during the year. One, recommended to Congress by the Automobile Manufacturers Association, was to set up the federal-aid highway program on a 10-year basis instead of the usual two or three years. Such a program, perhaps revised on a five-year basis, would give state highway departments a better basis for their advance planning. Another service to transportation came from the General Motors Co., which conducted a prize contest in search of an ideal national highway policy. Most of the big winners were professional engineers, and although few novel ideas submitted were considered meritorious, the contest performed a major public service in spotlighting still further the urgency of the highway problem. The pay-off remains to be seen in the legislatures and Congress.

• **Night roadwork coming**—Highway finance probably was the toughest problem brought up by traffic pressures, but there were construction problems, too. For instance, on New York's Northern State Parkway it was necessary to run a resurfacing job mostly at night, leaving the roadway free for travel during the daytime rush hours. Using two asphalt pavers, the contractor did six miles of four-lane two-course resurfacing in 6 weeks. Aside from a few extra lights on the equipment, the work involved no change from daylight procedures. The forces that dictated this night work are such a commonplace in urban and suburban areas today that more night work seems in store for contractors as time goes on.

• **Formless concrete paving**—In concrete paving one advance in construction technique seemed ready for growing adoption. It was formless concrete placement. In 1953, several techniques were tried on Illinois projects. The most promising machine there consisted of a crawler-driven frame that mounted two screeds and a vibratory unit. The frame also carried side-forms 30 ft. long, which acted as slip forms. Concrete from a regular 34E paver was fed onto the subgrade ahead of the new machine, and a slab 24 ft. wide, said to be free of side slumpage, emerged from the forms' trailing edges. Although this contractor-made machine is not the first formless paving scheme that has been devoloped—one manufacturer is ready to put another machine on the market—it looks like one that should spur specifications changes that would make formless paving generally available. At present, standard highway specs call for regular side forms—a major material and labor cost item.

• **Sawed joints for concrete**—Crack control continued to get attention during the year. On several projects in various parts of the country, including the West Virginia Turnpike, sawed contraction joints have been specified. The success of joint sawing in crack control (pre-establishment of crack locations) depends on the speed with which cuts can be made after the concrete has set. But saw wear is greatest in green concrete, so there is economy in sawing at the latest time possible. On the West Virginia Turnpike the cuts are to be 18 ft apart. Every fourth cut will be made as soon as the concrete will cut satisfactorily. Cracking thus set up relieves shrinkage stresses already in the concrete. The second pass of cutting machines goes half way between the first cuts, two to three days after concrete is placed, and the final pass, being least critical may occur in a week or so.

• **Test roads**—Highway test roads faded from public attention during 1953, although one of the most important ones was in full operation. This was the Western Association of State Highway Officials' project near Malad, Idaho. In its second year, it began to show failures in under-designed stretches. The road sections, all of bituminous type, range from 6 to 22 in. thickness. Standard-load and overload trucks travel two loops to determine, among other things, an economic balance between truck weight and highway construction cost.

• **Bridges and tunnels: much talk**—Closely allied to highways are the nation's big bridges and tunnels, because the traffic growth that spurs highway work also sets up new bottlenecks that make major crossings economically feasible. The year 1953 heard lots of talk but little action on new projects—on both coasts and at points in between. One site in between is Mackinac Straits, where a proposed $96-million bridge got as far as the contract-letting stage, then appeared to founder on the pessimism of bond buyers. However, underwriters picked up the issue in December and offered the bonds for sale in January, 1954.

On the East Coast a second suspension span across the Delaware at Philadelphia was initiated during the year. At Baltimore the location for a tunnel under the Patapsco River was announced, and at the lower end of Chesapeake Bay a Hampton Roads bridge and tunnel stepped closer to realization as site borings were taken and the design contract was awarded. The tunnels in these proposed projects both will be of the sunken-tube type, thus possibly becoming the fourth and

(Continued on page 127)

SUCCESSFUL CONTRACTORS REPORT ON...

MADSEN

ASPHALT PLANTS

GLEN L. "DICK" ROWELL

J. C. COMPTON COMPANY

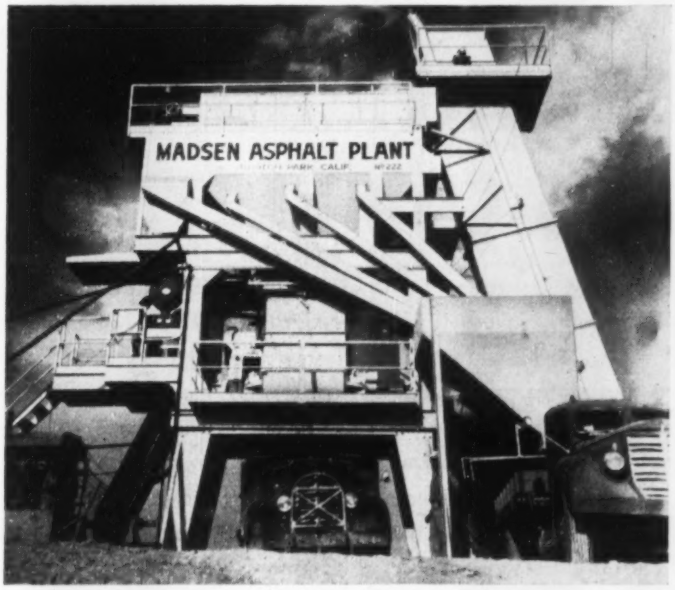
McMINNVILLE, OREGON

HELPING TO BUILD THE HIGHWAYS OF THE WORLD
MADSEN
Since 1910

***Says...*"Our maintenance cost and downtime for the production of 88,981 tons of mix was very low, and we are proud of our new MADSEN Model 481 4000-lb. Asphalt Plant."**

The J. C. Compton Company used their MADSEN Asphalt Plant to complete contracts on three highway jobs during the 1953 season. In spite of adverse rainy conditions, highest daily production was 1452 tons or 181 tons per hour of Class "B" Asphaltic Concrete mix.

- WHY NOT FIND OUT HOW THE MADSEN MODEL 481 4000-lb. BATCH CAPACITY ASPHALT PLANT CAN SAVE *YOU* TIME AND MONEY AND STEP-UP *YOUR* PRODUCTION? Write for your copy of Bulletin No. 800 and name of your nearest MADSEN distributor.



Here is the MADSEN Model 481 4000-lb. Batch Capacity Asphalt Plant in full operation. Note that the mixer operator station is located on the end of the plant away from fumes, heat and dust, where operator can see both in-coming and out-going trucks. Plant is furnished with complete safety equipment, larger operating platforms and stairway and caged ladderway structures. The oversize weigh-box unit is roller mounted for quick, easy access to mixer.

HERE ARE SOME OF THE REASONS WHY THE MADSEN MODEL 481 ASPHALT PLANT GIVES YOU REDUCED COST-PER-TON FOR EVERY TON PRODUCED

- **New MADSEN Model 440 Twin-Shaft Pug Mill Mixer (Patent Pending) with improved mixing action, faster discharge, built-in oversize capacity and precision-ground, externally removable sectional liners.**
- **MADSEN Pressure Injection System (Patent No. 1987243) which pumps the asphalt into the mill in 5 to 7 seconds.**
- **Faster mixing cycle. Bin gates, asphalt pressure injection, and mixer gate are all air operated to speed the mixing cycle and add tonnage at the end of the day.**
- **Unit construction, designed for quick, easy field erection and dismantling.**

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America's highways are beautiful. Don't make them a dumping ground for cans, bottles and rubbish.
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Garden State Road Materials, Inc.
GARDEN STATE
ROAD
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CEDAR GROVE, N.J.

"HAVEN'T BURNED A BEARING SINCE USING C-800," says "Doc" Dougherty. "We have saved a lot of money on engine life with C-800."

FEEDING ROAD OIL TO "SPREADER": In addition to C-800 motor oil, Garden State uses only Cities Service road oil.

"HIGHLY RECOMMEND CITIES SERVICE TO ANY FLEET OPERATOR," says Dougherty, after 30 years' maintenance experience with buses, trucks and construction equipment.

ANOTHER ROAD NEARS COMPLETION

Pictured above is a "spreader"—one of the 25 pieces of heavy road equipment constantly in use for the Garden State Road Materials, Inc., Cedar Grove, New Jersey. Although these trucks operate throughout four states, often under the severest conditions, William "Doc" Dougherty, president of the firm, reports that since using C-800 motor oil—"The rings do not stick, there is no sludge or varnish and we use less oil. C-800 motor oil is the best I have ever used."

Learn how you can increase the performance of *your* trucks with C-800 heavy duty motor oil. For details, contact your nearest Cities Service Office or write Cities Service Oil Company, Sixty Wall Tower, New York City 5, New York.

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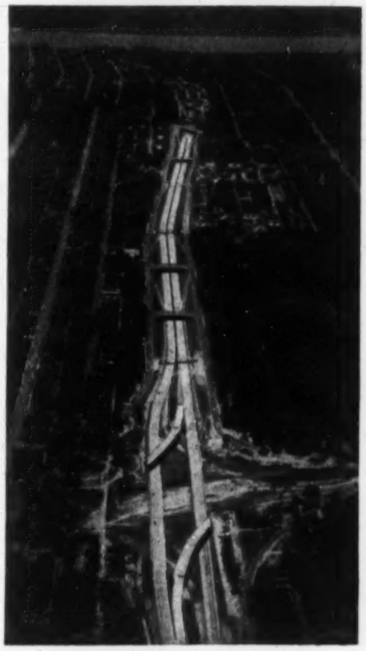
fifth sunken-tube tunnels out of six major vehicular tunnels built after World War II. The other tunnel, the third tube of New York's Lincoln Tunnel, is to be shield-driven. Shaft and approach work on this project progressed during 1953, and the major tunneling contract was awarded late in the year.

• **New Hudson crossing?**—The third tube would relieve some trans-Hudson traffic pressure, but need for still more lanes across the river has been known for some time. Speculation about the nature of a "fourth crossing" (in addition to Lincoln Tunnel, Holland Tunnel and the George Washington Bridge) was fanned in January, 1954 when the Port of New York Authority announced that it planned to spend $500 million on "bold improvements" in the ensuing ten years. Ideas ranged from simply double-decking the George Washington Bridge to construction of a new bridge or tunnel. Including approaches, a fourth crossing of the Hudson would eclipse all other projects on the East Coast—even the $90-million Lincoln Tunnel third tube.

• **Western bridges**—On the West Coast, 1953 produced at least one major bridge completion, (at The Dalles, Ore.) with others started—Umatilla, Ore., and San Francisco Bay's Richmond-San Rafael Bridge. And there are big prospects for more big bridges. In Seattle work on a new Lake Washington crossing is almost sure to develop in 1954. And near Seattle, sites for bridging deep Puget Sound are being studied and restudied. However, the Puget Sound crossing presents difficult design and financing problems, so there is likely to be no construction this year.

• **New bay crossings**—In the San Francisco area, legislative action in 1953 dictated a site for a new San Francisco-Oakland bay toll crossing. It calls for a low-level structure with subaqueous tubes under the ship channel 3 miles south of the present bridge. After much wrangling about the location, there is no longer any obstacle to construction of this crossing. However, 1954 will be taken up by further legal steps and detailed design work. This crossing is termed a political compromise. So far there have been no definitive economic studies of the location, but the necessity to raise nearly $200 million to build it might make such studies necessary. Revenues from the existing bridge, however, will be pledged against the new one so financing should be easy. Even more toll structures are in the discussion stages. A tunnel east of San Diego is being studied and a toll crossing of the Columbia near its mouth at Astoria, Ore., is being discussed. Neither have much chance of definitely materializing in 1954.



DETROIT EXPRESSWAYS take shape. John C. Lodge Expressway reaches toward Detroit River, at top of picture, as work proceeds (foreground) on intersection with Edsel Ford Expressway, which is being extended to this point.

• **Golden Gate strengthened**—Also on the West Coast, echoes of the Tacoma Narrows Bridge difficulties of 1940 were heard as truss-strengthening work proceeded on the Golden Gate Bridge. Storms had induced vertical movements of as much as 13 in., so a board of consultants had recommended a $3.5-million job to increase torsional resistance of the stiffening truss. The scheme adopted was addition of a bottom lateral system, which in conjunction with the existing top lateral system, would change the truss cross-section from an inverted U to a closed rectangle. Critical wind velocity is said to be increased from 50 mph to 80 mph.

• **Welding expands**—Two bridge-building techniques, welding and prestressing continued to gain during 1953—the former slowly, the latter at the accelerated rate that had begun the year before. Among the notable welded jobs were plate girder bridges in Iowa and Texas. The Iowa bridge, across the Cedar River at Cedar Rapids, is continuous over eight spans, of which two are 116 ft and six are 150 ft. In Texas, the maximum span on two girder bridges across arms of the San Jacinto River is 200 ft. This is believed to be the longest welded plate girder span in the world.

• **Prestressing popular**—In prestressing, a nation-wide study by the Massachusetts Department of Public Works showed 104 structures built or under contract, and 41 more in the planning stage. This summary was compiled from information supplied by 42 state highway departments. It included the longest prestressed structure—Lower Tampa Bay Bridge, which has 363 spans of 47-ft prestressed girders; also the longest span—Maryland's Shawan Road Bridge on the Baltimore-Harrisburg Expressway, which contains nine beams of 100-ft length. Pennsylvania leads in number of prestressed bridges built, most of them being of a prestressed deck-slab type for replacement of obsolete small bridges.

Bridge obsolescence remained a problem throughout the country, the year's news containing a familiar sprinkling of old-bridge collapses from overloads and accidents involving the destruction of compression members.

An advance in small-bridge construction was scored when Idaho engineers successfully precast beams and slabs of pumice concrete. This material has half the weight of stone concrete, thus easing the lifting equipment requirements at bridge sites—to name one advantage.

Another advance in bridge-building technique came when the New York Thruway Authority borrowed an idea from waterfront construction (New York's famous Pier 57) to build concrete caissons for eight piers of the Tappan Zee Bridge in an offsite dry basin and float them to place.

• **Precast wharf**—A refinement of the floating-in technique was used for a wharf at Kitimat, B.C. There, the combination of high tide fluctuation and a shallow dry basin dictated the construction of concrete wharf units on their sides. They then were floated to the deep wharf site and rotated 90 deg for sinking to position.

In the United States, improvements were noted at several places during 1953. Portland, Ore., completed a dry dock facility; Long Beach, Calif., was in the midst of a $50 million program; Georgia completed a marine terminal project; and the Port of New York Authority had major works under way at Port Newark and Hoboken, N. J. The Hoboken pier will have a prestressed concrete deck supported by piles with full cathodic protection.

While most of the technical advances in waterfront construction were in concrete, one event in steel is

(Continued on page 128)

notable. The De Long wharf, which has been an important contributor to speed in getting construction going at out-of-way places like Thule, Greenland (U.S. airbase) and Puerto Ordaz, Venezuela (iron ore development), was adopted for test by the U.S. Army Engineers for combat use. The wharf is a barge-like vessel with large vertical holes spaced along the perimeter. Cylindrical legs, or piers, are dropped through the holes to contact with the harbor bottom, then the barge is jacked up the cylinders, clear of the water. The barge, carrying cylinders, jacks and a crane, can be towed to an undeveloped site and installed with comparative speed.

• **New concrete drydock**—Concrete floating drydocks came into the 1953 news when the Navy began building one in the Puget Sound area. First to be built since World War II, it also was to be bigger—4,000 tons capacity, compared to 2,800 for the wartime structures.

The Navy also began looking into prestressed concrete for floating drydocks in February, 1953, awarding a contract for research on design criteria.

• **Military airfields dominate**—In airfield construction the public saw only a fraction of the total work. This fraction was mostly at commercial airports, where often as not the need for better facilities was painfully evident. For air traffic was growing much the same as vehicular traffic, outracing physical plant improvement and the financing on which it depends. The military airfields, both at home and overseas, enjoyed about twelve times as much construction volume in 1953 as did the airports. Total military volume was $485 million. But even that expenditure was lower than Congress had intended when it voted money for the work. Early in the year a construction freeze ordered by the new Administration delayed the award of many contracts while defense agencies screened non-essential work. Without such delays military airfield contract awards should be up sharply in 1954.

• **Airports uncertain**—The prospect for civil air facilities is less clear. Federal aid was suspended altogether last year while the Department of Commerce restudied the whole federal aid program, and it appears unlikely that it will be resumed this year. Federal aid, however, has not bulked large at most airports; 10% in a construction program is a commonplace. But mayors and other local officials contend that even this much frequently means the difference between delay and go-ahead on a project.

Among the big airport jobs in the 1953 news were a terminal building opened at Newark, N. J.; a continuing hangar-construction program at New York International Airport; development of Chicago's O'Hare Airport—a second major port for the city, work on a terminal building at San Francisco Airport, and a new terminal building at St. Louis.

At Edwards Air Force Base in California, a 15,000-ft runway was under construction. The longest yet built, this runway is to be used for experimental and test purposes. It does not indicate a trend toward longer runways for future operational airfields. The latest all-new military airfield, to be started shortly at Plattsburg, N. Y., will have a 10,800-ft runway.

• **Heliport plans needed**—Design criteria are less set in the field of facilities for helicopters. Brewing at low heat for several years, helicopter transport appeared to be nearing the boiling point in 1953. Helicopter airport-to-airport taxi services showed up in metropolitan areas, and one commercial airline announced an inter-city service. An agency predicted that helicopters would be carrying 6,000,000 commuters annually in the New York area by 1975. These developments led some city planners to fear that they would be caught napping by the rapid development of helicopters if provisions for helicopter landing were not incorporated in plans immediately. Needed were studies of site-selection criteria, heliport layout and size.

• **Railroads steady**—Probably the field of transport in which least change took place during 1953 was railroads. Aside from realignments, little new line construction occurred. But the railroads spent $1.2 billion for improvements to plant and equipment, making 1953 the sixth consecutive year of annual railroad capital expenditures above the billion-dollar mark. Significant improvements included big near-automatic freight yards and waterside iron ore unloading facilities. 1954 is expected to be another billion-dollar year for railroad capital expenditures.

• **Pipeline boom over**—In pipelines, activities seemed to be settling down after a postwar burst of natural-gas line construction. Biggest 1953 project in the United States was the Lakehead crude oil line from Superior, Wis., to Sarnia, Ont., via the upper and lower peninsulas of Michigan. Crossing Mackinac Straits, in water as deep at 250 ft, probably was the most difficult water crossing yet accomplished by pipeliners. Officials of pipeline companies seemed agreed that 1954 would mark a shift in emphasis from expansion of pipelines to increased operating efficiency.

Some major transportation projects

• **Maine Turnpike extension**—Picking up the existing Kittery-Portland 44-mi toll road (cost, $20.6 million), this 66-mi route will carry motorists northeastward to Augusta, the state's capital. Work began late in 1953, with completion expected in August, 1955. Cost is $55 million.

• **New Hampshire**, Massachusetts line to Concord—Like the Maine Turnpike, this 40-mi road up the Merrimac Valley is intended primarily to serve the tourist trade. First contracts on the $26-million project were let in 1953. It will be open to Manchester in 1956; to Concord in 1957.

• **Newburyport Turnpike**—When it is completed next fall, this free road, a 23-mi relocation of the main coastal road north of Boston, will cost $17.4 million. Final link will be a $4.4-million bridge across the Merrimac River. The first of four principal road contracts was completed last spring, and the others are scheduled for completion by July this year.

• **Boston central artery**—This limited-access elevated way eventually will cross the congestion of the city's oldest commercial district, with connections to arterial routes on both sides of the Charles River, and to Mystic River Bridge (northward to Chelsea). Since work began in 1951 more than $32-million worth of construction has been awarded. Seventeen contracts are included, two of which have been completed (foundations and steelwork for a bridge across the Charles) and four on which field work has not started (steel erection.) Completion date for the last of these contracts is Sept. 30, 1955, while a major portion is expected to be in use next fall. The contracts cover about 2 mi of main elevated roadway and ramps at the core of the estimated $125-million over-all project. A southerly extension is being studied.

• **New York metropolitan area expressways**—Heaviest emphasis is being placed on **Major Deegan Expressway,** because it will be New York's principal approach to the New York Thruway. Running along the Bronx bank of Harlem River, northward from Triborough Bridge, it is 7.5 mi long. Estimated to cost $55 million, Major Deegan Expressway was 35% complete at year-end. About $15 million in contracts remain to be let, for grading, drainage

(*Continued on page 132*)

the five M's of construction...

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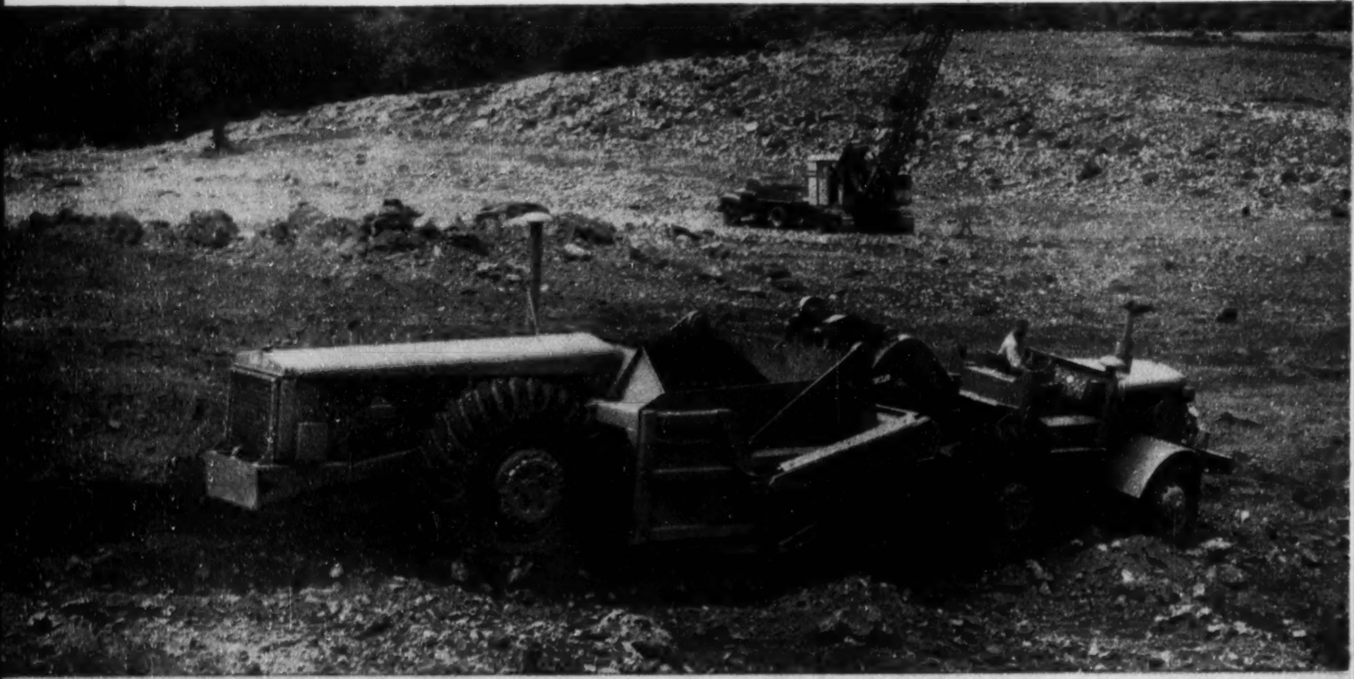
"Euc" Twin-Power Scraper . . . the One-Man Earth Moving Spread!



***High production** with one man and one machine*

- Total of 380 or 400 h.p.
- 18 cu. yds. struck
- Two Torque Converters
- Two Torqmatic Transmissions
- 4-section reversible and interchangeable cutting blades
- Hydraulically actuated bowl, apron & ejector—only 13 ft. of cable

Five years of field experience have proved the versatility of the Twin-Power Scraper for contractors, large and small . . . it's a self-loading scraper in practically any material.

It's paying off for . . .

LARGE CONTRACTORS . . . as an independent production unit or self-contained utility scraper for all loading, hauling and grade conditions.

MEDIUM SIZE CONTRACTORS . . . requiring maximum production with minimum capital investment . . . and scrapers that can work when adverse weather and job conditions stop other equipment.

SMALLER CONTRACTORS . . . who can bid on subcontracts with limited equipment and personnel . . . its versatility has helped to make these users successful bidders on big jobs, too.

But seeing is believing, so ask your distributor where the nearest "Twins" are working or see the new Euclid color film featuring the Twin-Power Scraper at work on a wide range of jobs. A new folder, Form T551, is available for the asking.

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GM GENERAL MOTORS

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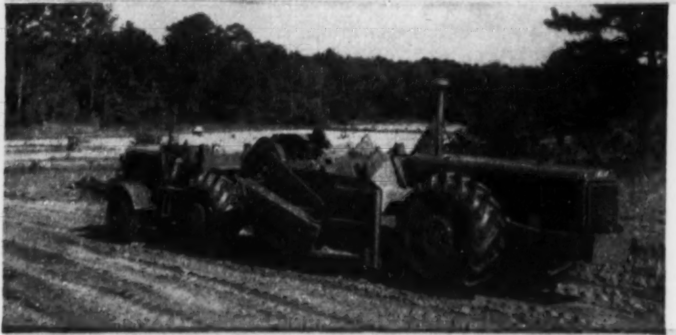
Top Performance on the Toughest Jobs . . . *anywhere!*

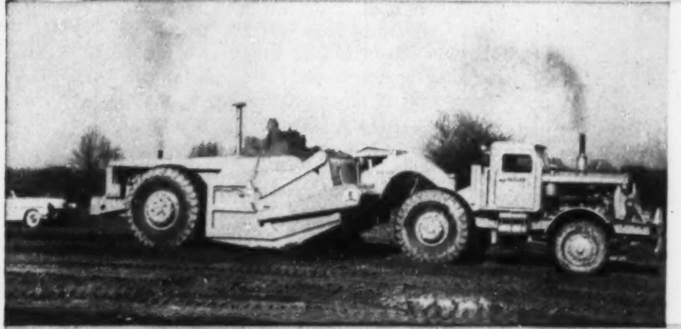
At Folsom Dam in California, Savin Construction Co. used 4 Twin-Power Scrapers as part of their large Euclid fleet. This well known contractor has purchased seven "Twins", having added additional units as a result of outstanding performance of his original machines on the New Jersey Turnpike. On big jobs like these, the flexibility of this scraper really pays off in high production and low cost per yard.

"Twins" have proved to be an ace in the hole for J. C. Critcher Inc. of North Carolina in getting larger, more profitable contracts. On this mountain highway job the "Euc" gave such a good performance that a second machine was purchased before completion of the contract. With two 190 h.p. engines and torque converters, the "Twin" easily climbed grades where crawlers and pans had to have pusher assistance.



Working in sandy clay on this Alabama road job, the Twin-Power Scraper proved a versatile, high production machine for L. J. Cousins Construction Co. Ability to self load and carry heaped loads up to 24 cu. yds. at speeds five or six times as fast as crawler drawn scrapers makes this "Euc" a top performer on small jobs as well as the big ones.

Tough loading conditions on the New York Thruway are taken in stride by the five Twin-Power Scrapers used by John Arborio on a 2½ million yard contract. Because of their tremendous power and traction the "Eucs" were able to work in the sticky, wet clay that stymied other equipment on this section of the big job.



Working on the Ohio Turnpike for Western Contracting Corp., this Euclid Twin-Power Scraper has top extensions that increase the struck capacity to 21 cu. yds. On one section of the job, the scraper picked up loads averaging 23 cu. yds. in 1.1 minute and made a complete 4700′ cycle—load, haul, spread and return—in 5.3 minutes.

Stripping blue clay at an open pit gypsum quarry in Iowa, this Euclid has plenty of power and traction to self load and haul to the waste dump at high speed. Daily production records on this job show that a Euclid Twin-Power Scraper can move as much yardage as four crawler tractors and pans of comparable size on an 800′ haul.

WRITE TODAY for performance data and a new catalog on Euclid Twin-Power Scrapers

EUCLID DIVISION

GENERAL MOTORS CORPORATION
Cleveland 17, Ohio

MOVE MORE LOADS PER HOUR AT MORE PROFIT PER LOAD WITH TWIN-POWER SCRAPERS

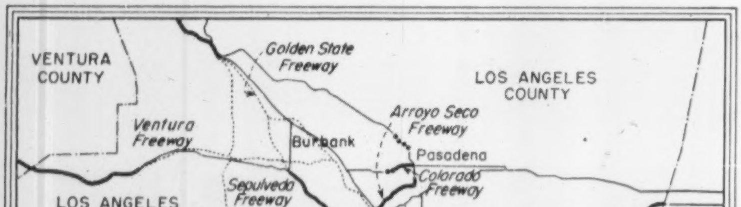
structures, paving, and an elevated structure through Bronx Terminal Market. Depending on legislative appropriations, the project is scheduled for completion in 1955. Also in the Bronx is **Cross-Bronx Expressway,** a 5-mi east-west route that will cost $72 million. Physical completion is more than 25%, with construction so far on the east half, and some sections already carrying traffic. Previously tied in between Kosciusko Bridge and Williamsburg Bridge, **Brooklyn-Queens Expressway** soon will carry traffic on another link. This one is between the Brooklyn plaza of Brooklyn-Battery Tunnel and Brooklyn Bridge. A three-level waterfront roadway has stood idle for three years pending the completion of connections at each end. Completed during 1953 was an $11-million, 1-mi connection of **Van Wyck Expressway** into a complicated Queens interchange involving Grand Central Parkway, Interborough Parkway and two principal streets. This work provided a limited-access route between La Guardia and Idlewild airports.

- **Captree Causeway**—This 2-mi project will connect Long Island (N. Y.) with the eastern end of the 20-mi barrier beach that includes famed Jones Beach near its western end. Principal structure is a 600-ft center span cantilever arch bridge, which was closed last fall. There also is a bascule bridge. The $11-million project will be opened in mid-1954.

- **Welfare Island Bridge**—Crossing the east channel of East River, this $6.5-million lift bridge to New York's Borough of Queens will be opened late in 1954. Present vehicular access to Welfare Island and its hospitals is by an elevator from Queensborough Bridge. Traffic turning out to take the elevator impedes through bridge traffic.

- **Lincoln Tunnel third tube**—With its approaches, this bore will cost $90 million —$3 million more than the original pair of tubes with their approaches. The principal tunnel-driving contract, $17.3 million, was awarded in October. Previously awarded were contracts including those for liner plates ($10.6 million), New Jersey shaft ($0.5 million), New York shaft and adjacent tunnel landward ($2.5 million), and shield ($233,000). The two-lane tube, to be almost 8,000 ft long between portals, will be open in 1957.

- **New York Thruway**—By year-end all but 4 mi of the 427-mi New York-to-Buffalo toll road had been placed under contract. Physical completion was about 40%, and paving had been completed on 181 mi. First toll operation will take place this summer on a 110-mi stretch between points near Rochester and Verona; by year-end the Thruway will be in service between Buffalo and Suffern, about 400 mi. Suffern is west of the Hudson River, where 3-mi Tappan Zee Bridge is 30% complete. This bridge was delayed a short time because of the authority's failure in December, 1952 to obtain bids on a tied-arch design for the main structure. It was re-advertised as a 602-1212-602-ft cantilever, and two bids were received in April, 1953. Fabrication now is under way on the $28.8-million contract. Foundations for this structure and nearby spans are pile-supported buoyant boxes similar to those used for New York's famed Pier 57. This is the first use of the buoyancy principle in bridges. Like the Pier 57 boxes, these were built below river level in a dry pit, which then was flooded so the boxes could be floated to the site and sunk to grade. The New York Thruway Authority expects the entire route to be open in mid-1955, when the bridge is completed. Stated overall Thruway cost is $500 million.



LOS ANGELES metropolitan freeways radiate from city center. Noted four-level interchange is meeting point of Harbor, Hollywood, Arroyo Seco and Santa Ana freeways.

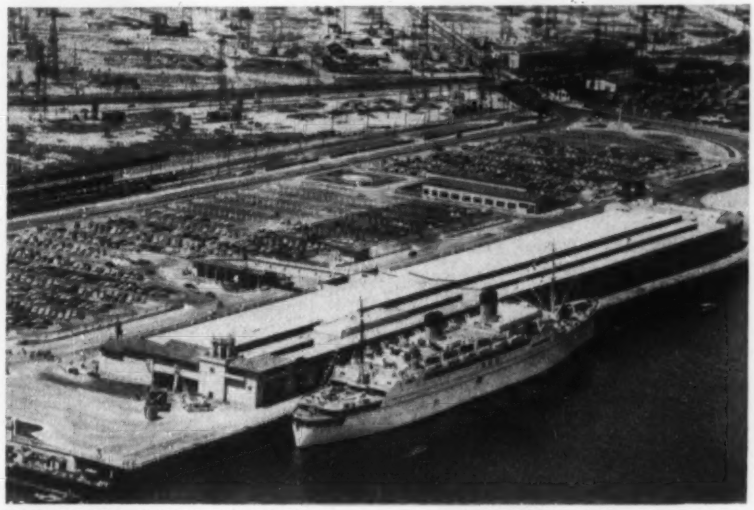
- **New Jersey Turnpike**—At year-end, work had begun on an 8-mi spur connecting the Turnpike with Holland Tunnel under the Hudson River at New York. To cost $104 million, the spur includes a high-level bridge across Newark Bay.

- **Garden State Parkway**—Like the New York Thruway, this 165-mi, $285-million, north-south route originally was planned as a free road. Two sections had been in use when the New Jersey Highway Authority took it over in 1952 to build and operate it as a toll road. Construction now is under way or completed along most of the remainder of the location, 130 mi having been under contract Jan. 1. Completion of the whole facility is expected by the end of this year. Termini are Cape May and Clifton, the latter being in the New York metropolitan area.

- **Pennsylvania Turnpike**—A 33-mi extension eastward from the present terminus at King of Prussia will take the pioneer modern toll road all the way to the Delaware River, where a bridge and 6-mi connection to the nearby New Jersey Turnpike are planned. The Pennsylvania extension, to cost $65 million, will be complete this year.

- **Delaware River Bridge**—Located 3.3 mi downstream from the Philadelphia-Camden 1,750-ft main span suspension bridge, this bridge also will be a suspension type. Main span of the new bridge will be 2,000 ft., carrying 7 traffic lanes. Bridge foundation work began last summer and overall project progress was 5% Jan. 1. The $90-million project length is 6 mi, including approach roads and structures. Completion is scheduled for the spring of 1957.

- **Schuylkill Expressway**—To connect downtown Philadelphia with the Pennsylvania Turnpike at King of Prussia, this free route includes 12.5 mi outside the city and 6 mi inside. The portion outside is wholly under contract ($17.5 million) and open for 4 mi in one direction. It will be fully open by mid-summer. Inside the city, where $60-million worth of construction eventually will be performed, there will be two bridges across the Schuylkill. A start was made on in-city work in November, 1953, under contracts totaling $8.2 million. These contracts cover 2.8 mi beginning just outside the city limits.



CARGO-PASSENGER TERMINAL costing $8 million was completed in 1953 at Los Angeles Harbor. Project took four years to build.

• **Penn-Lincoln Parkways**—Now in use are 7-mi of **Parkway** East and 9.2-mi **Parkway West**, which radiate in opposite directions from the downtown area of Pittsburgh. Parkway East also includes a downtown interchange, which extends through the heart of downtown Pittsburgh. This project is undergoing stage construction expected to continue at least through 1956. In 1953 8 contracts totaling $8.4 million were let for work on the downtown interchange. These contracts are about half completed. Still uncertain is a proposed link between Parkway East and Parkway West.

• **Bethlehem by-pass**—This project, which will eliminate almost continuous urban driving for through traffic in the Pennsylvania cities of Easton, Bethlehem and Allentown, is 22 mi long. At present a principal route between New York and the Pennsylvania Turnpike passes through these cities. The by-pass will be complete late in 1954 at a cost of $16.2 million.

• **Baltimore-Washington Parkway**—Ten miles of this four-lane divided route, built by the state of Maryland, were opened in 1953, along with 7 mi of the federal government's 19-mi share. The remainder, including a bridge across Anacostia River near the District of Columbia line, will be open in the fall of 1954. Federal cost will be $16.5 million. The state cost, including 8 mi of connecting expressway, was $14.5 million.

• **Annapolis-Washington Expressway**—All construction to date has been between Chesapeake Bay Bridge and U.S. 301; project distance within these limits is 13 mi, including 10 mi opened in 1953. The remaining 3 mi includes Severn River Bridge, opened in mid-1953 at a cost of $7 million. Roadwork on this 3-mi stretch is 85% complete, and should be opened this year. Westward from U.S. 301, 6 mi is expected to be awarded this year.

• **West Virginia Turnpike**—Rugged earthwork through mountainous terrain characterized 1953 construction on this 88-mi toll road from Charleston southward to Princeton, W. Va. Award of concrete paving contracts near the end of the year completed the major commitments, and the two-lane road (with 27 mi of "creeper" third lanes for slow traffic up heavy grades) is expected to go into service late this year. A half-mile tunnel was being lined at year-end, and erection of three major bridges will be complete in the spring. The turnpike's cost, originally estimated at $96 million, will be about $115 million, mostly because of earth slides that have required heavy additional earthwork.

• **Tidewater Virginia projects**—The first of two new traffic-improvement projects in southeastern Virginia, a 2½-mi high-level bridge at Grey's Point near the mouth of the Potomac River, got under way in October with the award of a $570,000 contract for approaches. Cost will be $15 million. Financing for this bridge is tied in with other existing structures in the area, and with a proposed $46-million bridge-tunnel across Hampton Roads at Norfolk.

• **Savannah River Bridge**—To cross the Savannah River near the downtown section of Savannah, Ga., this toll bridge will have a structure length of 9,776 ft and a main-channel cantilever span of 710 ft. Bridge work is 60% complete, and the project, which also includes 6½ mi of connecting road in South Carolina, will be opened this year.

• **Lower Tampa Bay Bridge**—Construction for this 15.1-mi $13.5-million project is 80% complete. The largest contract, $7.6 million, includes a 4.2-mi structure containing 17,352 ft of trestle with 48-ft prestressed stringers; its main-channel crossing is a 1,584-ft cantilever bridge, soon to be erected. An outstanding feature of the project is an on-shore casting yard where almost 2,200 of the prestressed stringers have been produced. Shorter trestles, under another contract, feature precast deck units, and one of the structures contains a twin-leaf bascule bridge over an inland waterway. Completion is expected in September this year.

• **Ohio Turnpike**—Delayed by an asphalt vs portland cement controversy, this 241-mi toll road nevertheless was 75% under contract by the end of 1953, with the remainder of work due to be awarded early in 1954. Cost is estimated at $326 million, $212 of it for construction. The route crosses the northern part of the state, connecting with the Pennsylvania Turnpike on the east; a proposed Indiana turnpike is expected to pick up the route on the west, heading it for Chicago. Opening date for the Ohio Turnpike is October, 1955.

• **Ohio Expressways**—The Ohio State Highway Department expects to award about $75-million worth of contracts this year for expressway construction under a $500-million bond issue. There are 35 projects in the program totaling 120 mi of four-lane divided highway; either built new or converted to four lanes by building an additional pair of lanes. Last year contracts totaling $14 million were awarded for the construction of 22.8 mi of expressways. Major projects included: 2.2 mi of **Lakeland Freeway** in Cleveland ($1.5 million); 9 mi of **Toledo Expressway,** including Maumee River substructure ($5.2 million); 2.3 mi of **Akron Expressway** ($2.8 million); 7.3 mi of **Boston Heights-Northfield Expressway** ($2 million); and the Spring Street interchange in **Columbus** ($2.1 million). Construction was completed last year on 13 expressway projects having a total length of 61.6 mi and a total cost of $22 million. Most of these contracts had been awarded in 1951 and 1952. At the beginning of last year Ohio had 753 mi of urban state highways and 283 mi of rural state highways that have divided lanes or are 40 ft or more in width of pavement.

• **Detroit Expressways**—Construction contracts totaling $31.3 million were awarded last year on the 14.1-mi **Edsel Ford** and the 9-mi **John C. Lodge** expressways. Next year should see the final work on the two expressways placed under contract, while both are expected to be finished in 1957.

(*Continued on page 134*)

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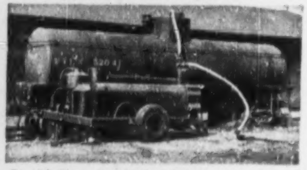

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Major transportation projects

A 3.4-mile section of the east-west **Edsel Ford** expressway—from Wyoming Ave to Maybury Grand Ave—is now being used, and a 1.3-mi extension eastward to the interchange with the **John C. Lodge** expressway should be completed this year.

The north-south **John C. Lodge** expressway is in use from West Grand Blvd. to Vernor Highway (2.5 mi), and an additional ¾-mi to Lafayette Blvd. will be opened to traffic this year. Construction completed or in progress totals $32.3 million, with an additional $6.5 million to be put under contract this year. All but $3 million of the $32.3 of right-of-way for this expressway has been purchased, and the remainder is being acquired.

The construction of both expressways is being expedited by use of funds from an $80-million bond issue. The bonds run for 24 years, with the Michigan State Highway Department dedicating $2.5 million annually to bond interest and retirement. The cost of the projects is being shared, 50% by the State Highway Department, and 25% each by Wayne County and Detroit. Federal aid is being used where applicable.

- **Chicago bridges**—The city undertook the largest bridge construction program in its history last year. And it also completed an unprecedented volume of bridge modernization, rehabilitation and reconstruction. A new $1-million underpass was completed; construction was expedited on three new river bridges and one viaduct-widening, to cost $12 million; contract plans were either completed or advanced for two river bridges and a grade separation, estimated to cost $10.5 million. Maintenance and repairs to the city's 60 movable bridges, 27 fixed bridges and 16 viaducts cost $1.6 million; while $2.1 million was spent on reconstruction, modernization and rehabilitation of four major bridges and one big viaduct.

Major construction plans for this year call for completion of the $5-million double-leaf, twin bascule **West Congress Street** bridge over the south branch of the Chicago River. Substructures of the double-leaf trunnion bascule bridges over the north branch of the river at **North Halsted Street** and over the south branch of the river at **West Van Buren Street** will be completed late this spring. A contract for the superstructure of the former was awarded last year and a contract for the superstructure of the latter will be awarded this year. Contracts for electrical installations, houses and enclosures for both bridges will also be awarded early this year. Both bridges are expected to be completed in 1955, at a cost of $3.3 million, each. All contracts for a $4.8-million double-leaf, trunnion bascule bridge over the Calumet River at **East 95th Street** are expected to be awarded this year.

Chicago has also started an extensive program of altering 32 of its existing movable bridges to permit one-man operation. Such alterations were completed at the **Kinzie Street** bridge last year and will soon be completed at two other locations. By the end of this year 10 such alteration jobs will have been completed or underway.

- **Chicago superhighways** — Construction contracts awarded last year for extension of South Wacker Drive, Congress Street and other superhighways totaled $4.8-million, plus $333,000 for removing buildings from rights-of-way. An estimated $15-million of construction contracts is expected to be let this year. One noteworthy event last year was the elimination of a harassing traffic bottleneck at West Foster Ave. and Sheridan Road by the opening of the Lake Shore Drive from Foster to Bryn Mawr Ave. Late in 1953 a low bid of $3.3-million was received for extending the Milwaukee-Dearborn-Congress St. subway from under the west bank of the South Branch of the Chicago River to South Desplaines St. where it will emerge from portal and continue in the median of Congress Street superhighway as an "open-cut subway." Two contracts totaling $1.7 million and $1.1 million, respectively, were let last year for parking structures in the city's $50-million parking-garage program.

- **Paseo Bridge**—To connect the main part of Kansas City, Mo., with a growing residential and industrial area north across the Missouri River, this $16 million toll bridge will be opened late this summer. Steel erection, began late in 1953. Total project length, including approach parkways, is 3.3 mi. Its main structure is to be a self-anchored suspension bridge with 616-ft main-span length. There will be two traffic lanes in each direction.

- **Bay St. Louis Bridge**—Precasting 478 122-ton deck units of half-roadway width was a feature of the construction of this 2-mi 4-lane structure between Bay St. Louis and Pass Christian, Miss. Measuring 27.5x41 ft in plan, the slabs were placed on barges by a special gantry crane, then floated to place. The 6 million project, opened to traffic last summer, is a low-level trestle type crossing, except for a 124-ft double-leaf bascule over a navigation channel.

- **San Jacinto Bridge**—Two bridges nearing completion across arms of a Houston water supply reservoir on the San Jacinto River contain welded girders 200 ft long —believed to be the longest girders of their type in existence. Overall lengths of the bridges are 1,324 ft and 721 ft, each including a 3-span continuous section with 120-200-120-ft span lengths. They will carry four lanes of highway traffic.

—Major transportation projects

• **Texas expressways** – Contracts totaling $16 million were awarded last year by the Texas State Highway Department for expressway construction. Of that amount, $13 million was completed. To date, 196 mi of the state's 1,600 miles of designated expressways have been completed. Since World War II, a total of 60 mi of super urban expressways have been completed within the major cities, at an average cost of $1-million per mile. About $24 million of contracts are expected to be awarded this year for expressway construction.

• **Alaskan Way viaduct** – Work was brought to completion during 1953 on this $10-million Seattle project. Work proceeded on a $2.5-million contract for a vehicular subway, Seattle's first, to connect the north end of the viaduct with the main highway out of the city. The subway will be completed this year.

• **Seattle, Wash.**–Work was begun on the piers for a $7 million bridge across the Duwamish River at First Ave. S., under a $1.4 million contract awarded late in the year. The structure has unique piers that float during construction.

• **Snohomish River Bridge**–A $2-million lift bridge across the Snohomish River near Everett, Wash., is under construction. The bridge will have a 131-ft lift span flanked by two 180-ft truss spans and has in addition two 240-ft truss spans. Approach spans bring the bridge length to nearly 2,500 ft. Completion is scheduled in 1954.

• **Columbia River bridges**–Traffic moved across The Dalles Bridge from the Oregon to Washington shore of the Columbia River Dec. 18 as Wasco Co., Ore., officials and Oregon-Washington governors joined in dedicating the $3.5-million project. Near year's end, Umatilla Co., Ore., had awarded contracts of $2.9 million for the fifth Columbia River span to link the two states. Completion is scheduled for April, 1955. Survey funds have been authorized by Oregon's Clatsop and Washington's Pacific Counties at the mouth of the Columbia for preliminary studies of building a bridge across the mouth of the river at Astoria.

• **Columbia River Highway**–All but 10 mi of this 68.8-mi portion of U.S. 30 through the famed Columbia gorge, replacing obsolete roads built from 1917 to 1922, have been opened to travel along the new waterlevel route between Troutdale and The Dalles, Ore. In October, the Mosier-Rowena section just west of The Dalles was opened a month ahead of schedule to bring total contract cost of work done to $25 million, two-thirds of which was expended in 1953.

(Continued on page 136)

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Work has included major community by-passes; relocation of railroads; hydraulic fills (totaling 6,500,000 cu yd); reduction of rise and fall by 5,380 ft; and reduction of curves by 24,200 degrees. The final east link into The Dalles is slated for completion in late 1954.

• **T. H. Banfield Expressway**—Running 14 miles eastward from midtown Portland, Ore., through a 5.8-mi gulch, the 4-lane expressway honoring Oregon's long time highway commission chairman is progressing in sections on the east end. Portions have been opened to local traffic and at year's end contracts of $4 million had been let, rights-of-way for the $16.3 million project have cost $4.4 million. Completion is slated for 1957.

• **Portland-Salem Expressway**—Contracts on this new route to link Oregon's major metropolis with the capital city have so far exceeded $6 million of the total $11 million estimated construction cost. Major unit is a new four lane Willamette River bridge due to open in May and replace a ferry that has operated since pioneer days. This route is slated for completion in October, 1955. Also included is a 10-mi bypass to ease congestion in Salem.

• **Salem, Ore., Bridge**—Completed in November, this Willamette River span in the heart of Salem cost $2.8 million. It carries two lanes of traffic paralleling an older two-lane span. Work included a four-lane approach pattern plus installation of electric coil heating elements to keep bridge approaches from icing.

• **U.S. 99 in Oregon**—Relocation of some 75 mi of highway between Eugene and Roseburg, major travel-time bottleneck on this trunk interstate route moved ahead during 1953. Chenoweth-Deady 7.9-mi portion is slated for completion in July. By year's end work schedules for this total $17-million program listed over $12 million under contract. The entire route will have controlled access, no crossing at grades and side road entries made via traffic interchanges.

• **Bayshore Freeway**—Traffic artery south from San Francisco was extended considerably in 1953 with 4.6 mi completed and 10.5 mi under construction. Northernmost segment slated for completion in the fall of 1955 takes the freeway almost to the Oakland-San Francisco Bay Bridge approach—contract for final link will be awarded in 1954. Among the units finished in 1953 is an all-welded $3-million elevated 8-lane highway viaduct 0.7 mi long. Contracts for freeway units completed or under way in 1953 total $25.5 million.

• **Eastshore Freeway**—This freeway ultimately will link Richmond and San Jose, Calif., passing through Oakland and Berkeley. During 1953 a 3.9-mi, $2.6-million section just south of Oakland was finished and at the southern end of the freeway a 1.8-mi, $1.3-million section near San Jose was put in use. Total construction completed in 1953 or still in progress amounts to $15.6 million. Still under way: a 1-mi section north from the East Bay terminus of the Oakland-San Francisco Bay Bridge, where dredged fill for the highway is now completed under a $2.5-million contract that includes a reinforced concrete box girder undercrossing; a 3-mi segment north of that through Berkeley under a $4.3-million contract on which work started in October; a 0.3-mi, $1.3-million section in Oakland, and an 8.1-mi, $2.7-million segment near San Jose. Contracts have not been awarded for 14.5 mi of the freeway. And bids will be called early this year (1954) for a $5.6-million project designed to re-route traffic on the Oakland distribution structure for the San-Francisco-Oakland Bay Bridge.

• **Richmond-San Rafael bridge**—The 4½-mi bridge, which will cross the north end of San Francisco Bay and cost $62 million is slated for completion in August, 1956. Work on the bridge began in March, 1953. It will be a multiple-span steel cantilever, truss and girder bridge. By the year's end steel was being set on the Richmond approach superstructure and other steel was being fabricated. On the substructure, 1,751 of 4,935 piles had been driven and five of eight cofferdam piers had been completed with the other three slated for January. Most of the piers are being built with precast shells and none of the deep water units are as yet completed. Contracts have been awarded for a $269,000 mole fill approach on the Richmond side and a $177,000 trestle approach on the San Rafael side.

• **Los Angeles freeways**—In the Los Angeles area during 1953, contracts were completed on 25.9 miles of freeways (including 59 bridges and other structures) costing $31 million. As the year ended, an additional 31.2 mi was under contract for $49 million. A major boon to motorists was completion of approaches to the famous **4-level separation** connecting the Hollywood, Santa Ana, Arroyo Seco, Ramona and Harbor Freeways. Work on the Arroyo Seco approach was finished in September. Work continues on other freeways under these contracts: **Hollywood Freeway,** 1 mi, $3 million; **Santa Ana Freeway,** 7.4 mi, $9.7 million; **Ramona Freeway,** 10.2 mi, $11.1 million; **Harbor Freeway,** 2.4 mi, $5.2 million. Other contracts in effect are **Long Beach Freeway** (formerly Los Angeles River Freeway, but renamed at the request of the city of Long Beach which it will connect with Los Angeles), 5.3 mi, $7.4 million; **Colorado Freeway,** 1.5 mi, $5.4 million; the **Golden State Freeway,** connecting the Ridge Route to the north with major arteries in the San Fernando Valley and eventually with downtown Los Angeles, was begun in 1953. Out of a contemplated 29.8 mi, 3 mi is under contract for $3.3 million. The $3.6-million **Arroyo Seco Bridge** connecting the Colorado Freeway with Pasadena was opened to traffic, though remaining work on the west end was not scheduled for completion until April, 1954.

• **Hilo, T. H.**—The most expensive and most difficult portions of the 40-mi 24-ft wide Hamakua Coast Highway are now complete or programmed for 1954, but work on the last 10 mi will be slowed because a special federal grant has been exhausted and further funds will have to come from regular federal aid, territorial public works and county fuel tax moneys. At the end of 1953, 26 mi of the road along the high-gulch-pocketed coast were complete, 2 mi more were under construction and 1.8 mi more were programmed for 1954 with the last remaining special federal funds at a cost of $1.2 million. The project, requiring 40 major and several minor bridges, and totaling about $16.5 million in cost, serves a rich sugar growing area.

• **Honolulu, T. H. Highway**—The first section of Honolulu's second postwar arterial highway was opened to traffic in late 1953. The first arterial, running along the waterfront, was completed at the end of 1952. The second, more than a mile inland, eventually will cover 7 mi and cost about $30 million, including $14 million for land acquisition. Completion will be gradual and may take until 1967. The **Mauka** (meaning "toward the mountains") **Arterial's** first mile segment cost $1.8 million to construct. An additional mile, estimated at $1.2 million, is programmed for 1954.

• **Honolulu, T. H. tunnels**—Two tunnel routes are being developed to move traffic across the Koolau Mountains, which separate Honolulu from its fast-growing suburbs in Windward Oahu. One involves improving an existing highway with U. S. and Territorial funds. The other, undertaken primarily with City-County funds, pushes through previously unopened land.

On the existing route, through Nuuanu Valley, another mile of approach road was completed in 1953, by-passing 11 turns with a gigantic horseshoe. Another mile, the first on the Honolulu side, will go under contract in 1954. Work on a 1,000-ft two-lane bore near the peak of the mountain pass will start in 1954. A shorter parallel tunnel will be built later.

(Continued on page 138)

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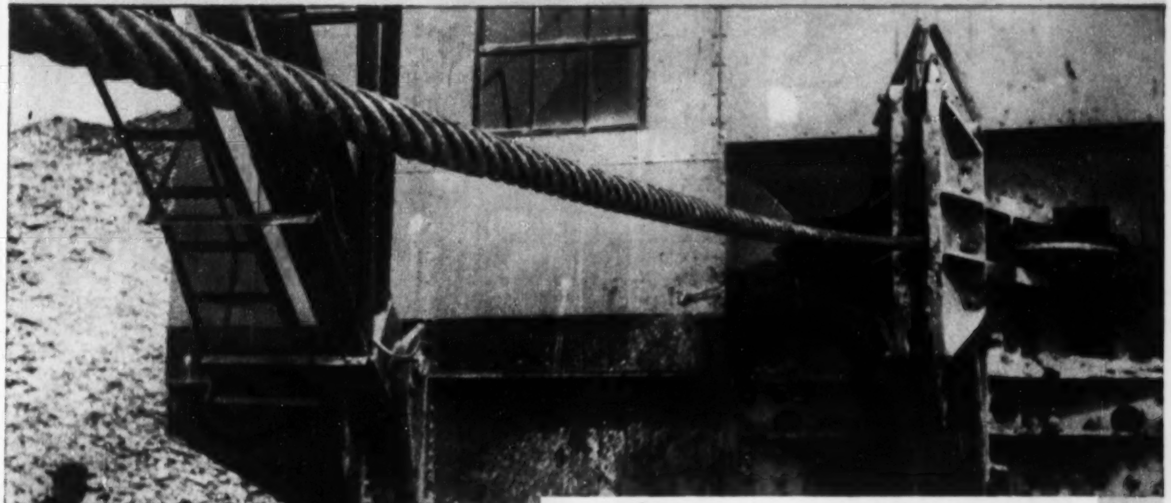

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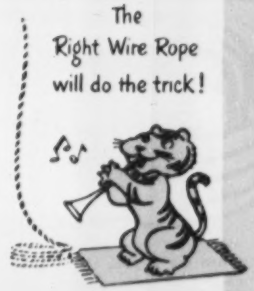
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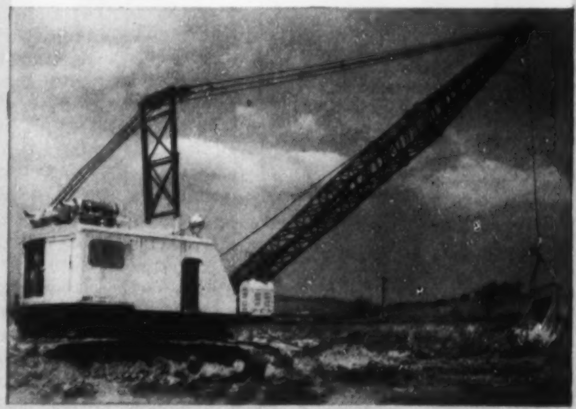

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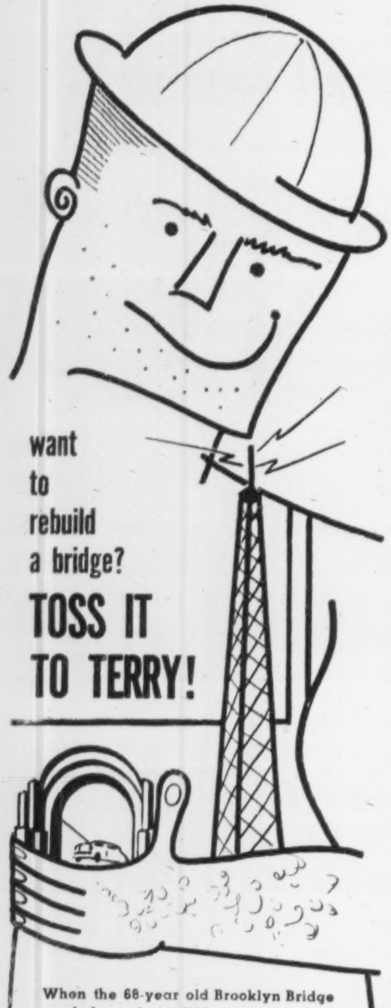

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Completion should come about 1958 with a total cost of about $7 million for a 4.2-mi stretch.

On the city-county's new route through Kalihi Valley, a $4.5-million contract was awarded late in 1953 for a 2,773-ft tunnel, portals, vents, ventilator buildings and 2,000 ft of approach roads. One approach road contract is nearly complete and two others are to be let in 1954. Total cost is estimated at $6 million with completion hoped for in 1955.

• **Harlem River Bridge**—Steel erection for this $18-million New York Central Railroad twin lift bridge in New York began in 1953, aiming at 1956 completion. Each lift span will carry two tracks. Together they will replace an obsolete swing bridge over which all Grand Central Terminal traffic moves.

• **New York subway**—A BMT-IND underground connection at Queens Plaza was completed during the year at a structural cost of $8 million. Meanwhile, no effective moves were made toward construction of the Second Ave. Subway, for which a $500-million increase in the city's debt limit was voted in 1951.

• **Cleveland railroad bridges**—Two of six movable railroad bridges were completed last year in a bridge-replacement program on the Cuyahoga River in Cleveland, Ohio. The $18.8-million program, now 27% complete, is being executed under joint-participation agreements between the U. S. Corps of Engineers and four railroad companies. Construction contracts awarded last year in the program totaled $5.6 million. Two of the bridges are now 32% and 7% complete, respectively. By July of next year the four bridges are expected to be 80%, 32%, 35% and 31% complete, respectively. The two completed bridges (N.Y.C.&St.L.) and (N.Y.C.) are single-track, vertical lift with spans lengths of 234-ft and 260-ft, respectively. One of the other four bridges (B.&O.) is a 255-ft single-track trunnion bascule. The other three are vertical lift. They are: 217-ft span, single-track (N.Y.C.); 265-ft span, double-track (N.Y.C. and P.R.R.); and 267-ft span, double-track (N.Y.C.&St.L.). All four bridges are scheduled to be finished in 1956; one in June and the others in December.

• **Taconite railroad**—Reserve Mining Co. completed 32 miles of standard-gage, single-track railroad in Minnesota last year, and will complete an additional 15 miles this year. The 47-mile "inter-department railroad" will haul crude taconite from the company's taconite mine and preliminary crushing plant at Babbitt to its processing plant under construction on the shore of Lake Superior near Beaver Bay. Initial production of taconite concentrates containing over 60% iron is scheduled to start by the end of next year at the rate of 2,500,000 tons annually. Two years later annual production should reach 3,750,000 tons, with an ultimate long-range production of 10,000,000 tons per year.

• **New York area airports**—Hangar construction at New York International (Idlewild) Airport, and completion of a terminal building at Newark Airport were highlights of Port of New York Authority airport construction in 1953. At **Idlewild,** Hangar No. 6, a 6-bay structure covering 150,000 sf and costing $3 million, was completed in September. In May work began on $2.7-million Hangar No. 7, consisting of five bays with cantilever roof design. Completion is scheduled for June, 1954. There will be 90,000 sf of hangar space and 68,000 sf of shop and office space. Also in 1953 surcharge fill was placed at the location of Hangar No. 8, to consolidate the ground in preparation for construction, scheduled to begin in 1954. At Newark, an $8.5-million terminal building was dedicated in the summer. This was a second significant step in the modernization of Newark Airport, which had been closed in 1952 after a series of major air disasters had caused public protest in surrounding cities. A 7,000-ft $9-million runway had been put into operation in November, 1952.

• **San Francisco Airport**—Total cost of the new air passenger terminal, designed to accommodate 5,000,000 passengers a year, will be $11 million. Steel shortage (which forced substitution of concrete piles for steel ones) and 1953 laborers' strike delayed construction, postponing December, 1953, completion date to July, 1954. Still to be done: interior of the six-story building, paving of roadways. The 250,000-sq ft structure has concourses (for airline office space) radiating from the central building.

• **Edwards Air Force Base**—Paving started in December on a $6.3-million contract for a 15,000-ft runway and related paving at Edwards Air Force Base, in California. The plane test strip is the longest yet built. A $4.5-million railroad relocation job, necessary for the runway extension, was completed to the point of being opened to traffic, with final acceptance due early in '54.

• **Port of New York**—Superstructure work began in December on **New York City's Pier 57,** well-known for its buoyant-box substructure. Of steel-frame construction, the superstructure will account for about $4 million of the pier's $10 million over-all cost. Completion is expected after mid-

1954. Across the Hudson River, in Hoboken, N. J., the Port of New York Authority in September began construction of $7.5 million **Pier C**, which will replace three fire-destroyed piers. To be the widest pier in New York harbor, Pier C will have plan dimensions of 328x700 ft. It will feature cathodic protection of steel foundation piles, and prestressed deck stringers. The latter won in competitive bidding with an ordinary reinforced concrete stringer design. Also in New Jersey, at the beginning of 1953 the Port of New York Authority placed three storage sheds and adjoining wharf under construction at **Port Newark.** This work, to cost $4.7 million, will be complete this spring. It is in addition to two cargo storage buildings and wharfage that were completed last year.

- **Georgia Port**—New construction at the Savannah State Docks and Warehouses, comprising three transit sheds and a marginal wharf on the Savannah River, was complete in June, 1953. Total project cost was $5.5 million. No money has been appropriated by Congress to enlarge the channel to the project and to establish a turning basin.

- **Portland, Ore., Drydock Center**—Port of Portland dedicated a $3.5 million ship repair and drydocking center on Swan Island site in the middle of the Willamette River harbor facilities during the last half of 1953. Three drydock berths are provided.

- **Los Angeles Harbor**—A $25 million postwar development program was wound up during 1953 with completion of a $8 million passenger-cargo terminal for preferential assignment to the Matson Navigation Co. Dedicated in July after four years construction work, the terminal can handle 6,000 tons of cargo a day from three ships.

- **Port of Long Beach**—Completed in 1953 were projects totalling $6.8 million and another $10.1 million in works were underway at the end of the year. Biggest project was the $3 million Anaheim bridge into the harbor area. Now on the boards are projects totalling $17.2 million of a total of $27 million in authorizations. Included are two new bridge superstructures, one for $2.9 million, the other for $3.7 million.

- **Honolulu, T. H.**—Early 1955 completion is expected for the new $5.2 million overseas freight terminal being built by the territorial government in Honolulu harbor. A 1,717-ft concrete pier costing $900,000 plus $1.8 million for land is complete. Work is now progressing on the $355,000 sq ft pier transit shed. Total cost of the shed, with paving and sprinkler system contracts still to be let will be about $2.5 million.

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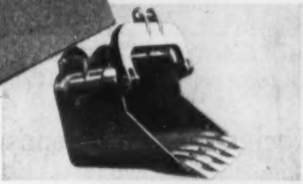
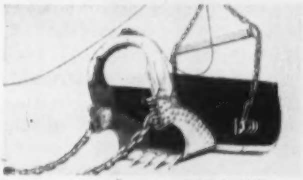
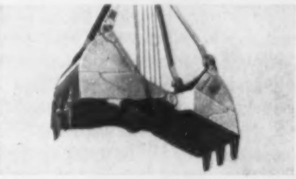


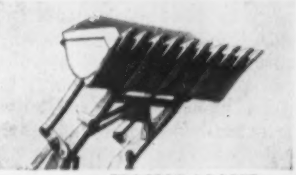
DIPPER



DRAGLINE



CLAMSHELL



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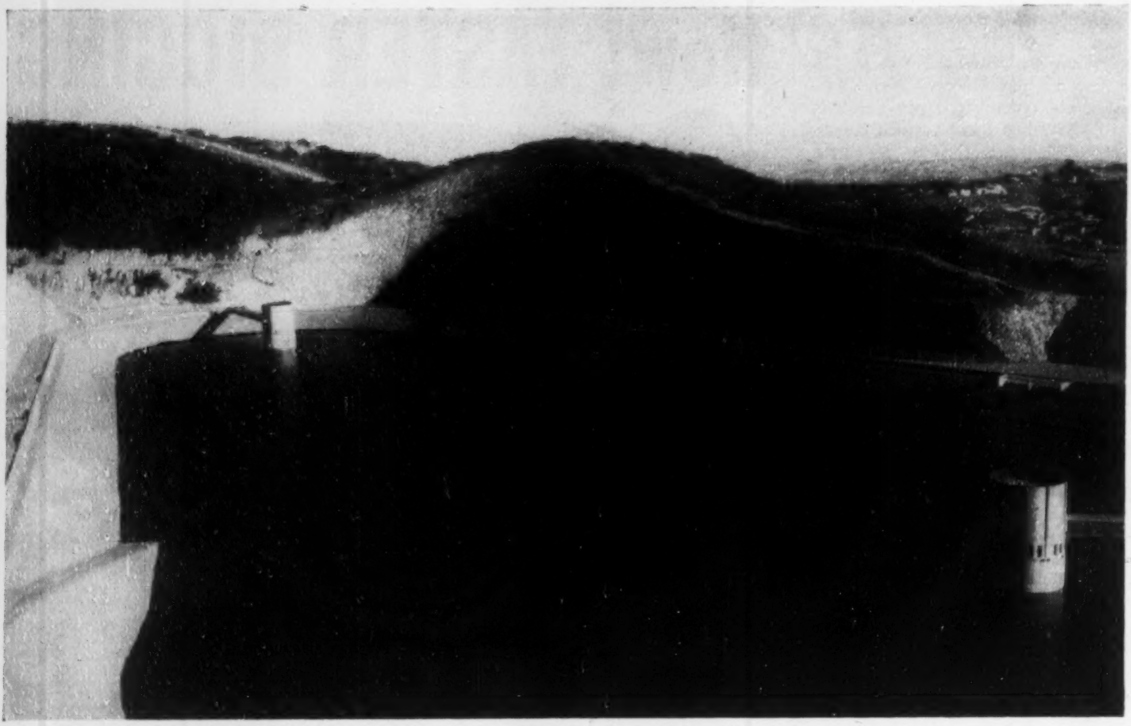


EAGLE ROCK RESERVOIR, storing 85 mg of water for Los Angeles will, together with a 171-mgd pipeline, form the city's first major connection with the Colorado River Aqueduct at a cost of about $9 million.

Techniques and trends . . .

Water supply and sanitation

Greatest influence in 1953 on waterworks and sewerage construction was easing of the municipal bond market. Population growth kept demanding waterworks; regulations and public opinion demanded sewerage. But it was the easing of financing, begun about June, that let these pressures push both waterworks and sewerage contract awards to new records in dollar volume.

Sewerage construction jumped last year to $431 million for a 37% increase over 1952; it was the first year contracts for this type of work ever exceeded $400 million. Waterworks contracts less spectacularly pushed upward to $247 million worth, 5%, above 1952's record volume.

At present, all signs point to continued high construction activity in the general field of water supply and sanitation. The financing picture remains rosy; the pressures will remain. As one indication of what's ahead, a recent ENGINEERING NEWS-RECORD survey of consulting engineers and architects showed they had a 61% greater dollar value of sewerage design on their boards than they had a year ago; 26% more waterworks. As another indication, there are the tremendous backlogs of proposed projects: now over $2.9 billion worth of sewerage and $1.5 billion worth of waterworks.

• **Sewage disposal**—In the booming field of sewage works construction, contracts totaling close to $475 million may be expected to be let this year. This is approaching the $500-million annual mark generally thought to be the desirable rate for spending to abate water pollution by municipal wastes.

Plants being built to do the needed job on cities' sewage are generally of standard, conservative design. A survey made by ENR last year, showed a postwar trend toward more secondary treatment, more chlorination of effluent, more trickling filter installations (with increased emphasis on high rate), plus growth of the activated sludge process in all its modifications.

Some new thinking was evidenced during 1953 on the ever-bothersome problem of sewage sludge disposal. Where sludge production is large, its disposal can be a major cost item in plant construction as well as plant operation. Three interesting efforts are being made to cut drastically the cost of sludge disposal:

• For the Allegheny County Sanitary Authority (Pittsburgh, Pa., and environs) a $17.6-million primary treatment works has been designed which will concentrate its sludge by flotation to a product 20% solids, dry enough to incinerate economically. Facilities for handling this concentrated (but foul) product in a closed system were the interesting part of the design. The flotation possibilities had been proved in pilot plant tests.

• Second effort to cut disposal costs was the thickening of sludge to one-third its normal volume at Bowery Bay plant in New York City. A process with revolutionary impact has been developed by minor changes at this plant serving 350,000 people. Effects claimed include high-rate digestion in one-quarter the usual space, plus elimination of need for secondary digestion. Digester construction cost savings of $2 to $3 per capita are envisaged.

• Thirdly, two independent efforts to improve digester efficiency have come up with proof that recirculation of digester gas can aid the process. In

THE DOWNSVILLE DAM, the major structure of Stage II of the Delaware River Development for the City of New York, will impound 143.5 billion gallons.

Washington, D.C., the idea was tried mainly to overcome a scum problem, which it did. In Columbus, Ohio, on basis of pilot scale tests, recirculation of gases has been credited with being able to accelerate digestion, to cut digestion time to one-third normal.

• Economy the goal—All of these moves to cut the cost of sludge disposal are creditable efforts. And there was one more during 1953: At Golden, Colo., a disposal plant built cooperatively by the city and a brewery (its principal industry) uses thermophilic digestion at 130F with claimed 75% reduction of volatile solids in 17 to 20 days. This compares with perhaps 55% reduction in the 30 to 60 days of conventional mesophilic digestion at the usual 80 to 98F range. This plant also makes use of flotation for concentration of sludge to about 12% solids. Neither the thermophilic digestion nor the flotation are brand new ideas, but their incorporation into a single plant marks it as radical and worth watching.

A treatment method of interest is the almost primatively simple idea of lagooning, now enjoying something of a renaissance. In North Dakota, where nothing is cheaper than wide open spaces, lagooning has been practiced since 1928. Sewage simply goes into an adequate earth basin; sunshine and wind help the biological workers of nature perform their processes; and an effluent of secondary-treatment quality discharges. The North Dakota Department of Health sees no nuisance conditions developing at sewage lagoons (unless they become overpopulated wild-life sanctuaries). More and more small towns, and cities up to 15,000 population, are turning to lagooning in the Northwest. And very significantly, near the end of last year the Health Department in the industrial midwest state of Ohio told its small towns lagooning would be approved on a trial basis if planned by reputable consulting engineers. Some of these small towns, hard-pressed for money and under pressure of the state to abate pollution, most certainly will hop on the lagooning idea—as perhaps the cheapest way out of their quandary. It remains for consulting engineers to advise whether areas of Ohio can meet the wind, space and climate requirements for effective, inoffensive sewage lagooning. The health director warned that a village trying it might be ordered to build a conventional treatment plant if lagooning does not work.

• Radioactive wastes—A significant treatment plant constructed last year was the nation's first full-scale installation for the treatment of radioactive wastes. It is a sewage works at the National Reactor Testing Station in Idaho, and its flow includes contaminated laundry wastes. Trickling filters were chosen for adaptability to the varied flow of "hot" wastes. Final effluent will go to a subsurface disposal field, there to be monitored. Digested sludge also will be monitored as it is discharged to drying beds.

• Industrial wastes—Industry continues to develop the know-how for treating its industrial wastes. But generally it lacks the incentive. The education effort continues its attempt to convince industry it is good business to avoid polluting streams. It is good public relations, and it has in some instances been proved sound economics to improve housekeeping or reclaim useful materials formerly wasted.

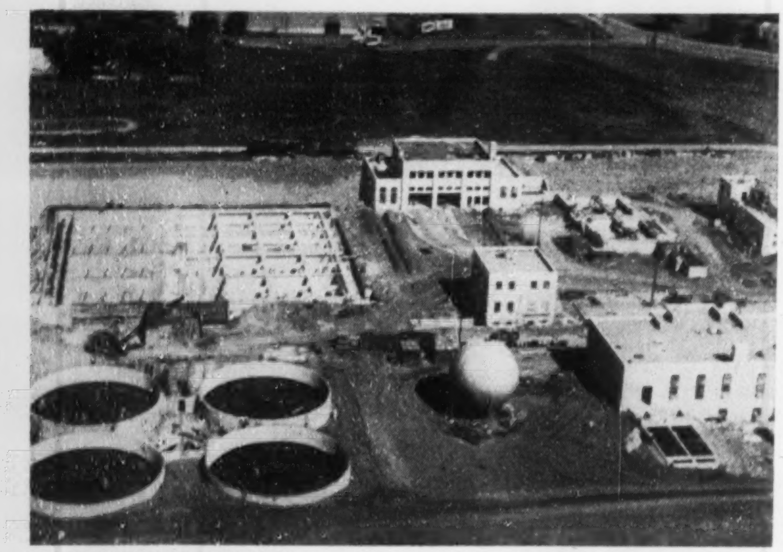
But industry rightly puts a dollar sign on waste treatment; it is a production cost for which sale of products must pay. It is logical, therefore, that the trend general business takes will determine how much money goes into construction of industrial waste works this year. Industrial waste works are most apt to be built during prosperity.

The same regulatory pressures against stream pollution that apply to municipalities are meant to apply to industries. To date, they are less effective in compelling industry to clean up its wastes; more actual progress has been made by impelling action through cooperation. Exactly how much progress, it is difficult to say. Facts of the industrial wastes problem are not as well known as are the facts of pollution by municipal sewage. Until more data are collected, progress will be difficult to gage.

Two years ago, there was an unsuccessful attempt to pass through Congress a bill to give fast write-off privileges, for tax purposes, to builders of industrial waste works. Last year Wisconsin enacted a law to grant industry tax concessions, for money spent on both stream and air pollution abatement. Such investments are exempt from all local property taxes for five years, and permitted to be amortized for state income tax purposes over five years instead of 20. This may prove good incentive for industry action. And the Eisenhower Administration may be able to get Congress to enact something comparable on the national level; such stimuli to industrial building in general were mentioned in the recent State of the Union address.

Perhaps the industrial-waste-works of 1953 was U.S. Steel's installation completed at sprawling Fairless Works, Morrisville, Pa. This was an example of industry's increasing realization that water supply and water

(Continued on page 142)



LITTLE MIAMI PLANT, a key project in the Ohio River Cleanup program treats a normal flow of 29 mgd of sewage and industrial waste for Cleveland, Ohio.

disposal are just two ends of the same problem. Every new industrial plant built should have complete control over process water from intake to outfall—as does Fairless Works. U. S. Steel had assured local authorities—and the local public—that the 250-mgd maximum flow it will take from the Delaware River will be returned to the stream without degradation of quality. Some $8 million are said to have been spent on the water and waste works at Morrisville.

There are other evidences of industry looking at waste disposal as a part of the overall water problem. In the industrializing Southeast, water is a major factor in plant location—not only water for cooling and water for process but water for economic, unobjectionable disposal of wastes. The same is true of fully industrialized areas where enforceable regulations make waste disposal a factor for prospective industry's consideration. More and more, industrial wastes problems are becoming a concern for industrial top management.

• **River cleanups**—There is progress, slow but sure, toward the cleanup of pollution in the nation's major streams. The postwar years have seen a 30% increase in the places served by sewage works and a 22% increase in population served by sewage works (while total U. S. population grew perhaps 14%). Here are a few significant instances of progress, or lack of it:

• The five-year-old Ohio River Valley Water Sanitation Commission claims a reversal of the long-time trend to increased pollution and sees indications that its job is half done. At present 43% of municipalities in the 8-state basin provide sewage treatment while 26% have plans approved or work under way; 66% of 1,247 industries discharging directly to streams have treatment facilities while another 12% are planning or building. Biggest single event of 1953 for Orsanco was dedication of one plant and ground-breaking for another in Cincinnati in October; the event was made an occasion for rallying 100 mayors of the region and pepping them up on pollution abatement.

• New York City, slowed by inability to pay salaries that will keep its engineering force up to strength, was unable to finish completely by the end of 1953 the $100-million first phase of its sewage works program. But works to remove untreated sewage from all recreation waters near completion, and the city still hopes to complete the second phase of its work (on waters other than recreational) by 1959.

• New Jersey's Raritan River is now, after many years of talk, a polluted stream about to see action. A $22.5-million trunk sewer project to pick up and treat wastes in the lower valley is under design by consultants for the Middlesex Valley Sewerage Authority. Meanwhile, a $7.8-million plan for works in the upper valley should soon go under design for a separate authority organized late last year in Somerset County.

• In the Columbia Basin, a state-federal survey has found need for 119 municipal and industrial waste treatment facilities at an estimated cost over $11 million. It should be noted that 82 of a former 201 sources of pollution have already been corrected.

• Wisconsin and Minnesota signed a pact last year for control of pollution on the Mississippi and other streams. Uniform regulations, concerted actions are sought.

• In Ohio, Youngstown finally authorized hiring of consultants last summer to plan a needed $10-million disposal plant. It had been the largest city in Ohio without a plant or plans.

• Pennsylvania in 1953 appropriated $2 million for state financial aid to municipalities in complying with orders to build sewage works. This is the first reported instance of direct state aid to cities for this purpose.

• The Missouri River was reported last year to need over $70-million worth of waste treatment plants on its main stem. These would include 115 new municipal plants, 63 industrial plants.

• Virginia says it has reduced its stream pollution load since creation of the State Water Control Board in 1946; 180 industries are said to have reduced or abated pollution by their wastes.

• The Tennessee River has become increasingly polluted, according to TVA's director of health. He claimed last year that pollution increased 35% in the decade following 1941. But projects now under way in major Tennessee cities augur well for reversal of the trend.

• **Sewer construction**—New publicity given to questionably built sewers again last year would indicate that the whole subject of sewer construction is due for some serious consideration. The problem is to get designer and constructor together on how to put pipe in the ground with assurance of structural soundness and minimum infiltration.

Cast-in-place concrete sewer of U-shaped cross-section and 5-ft inside width was built last year with a novel prefabricated steel form, eliminating sheeting and bracing. The device permitted a 100-ft pour a day on an outfall for the Department of Public Works in Brooklyn, N. Y. And on the West Coast additional experience was gained in construction of deep ocean outfalls as a 78-in. line was laid 7,000 ft off the Pacific shore as part of an $8-million project of the Orange County Sanitation Districts. Design of joints to prevent leakage of sewage near bathing beaches was an important feature of this work.

• **Water supply**—Scientists continue to investigate the triggering of rain and the desalting of sea water. Those actually in the rainmaking business are most concerned with proving effectiveness of their efforts; others concerned, like the federal government's

(Continued on page 145)

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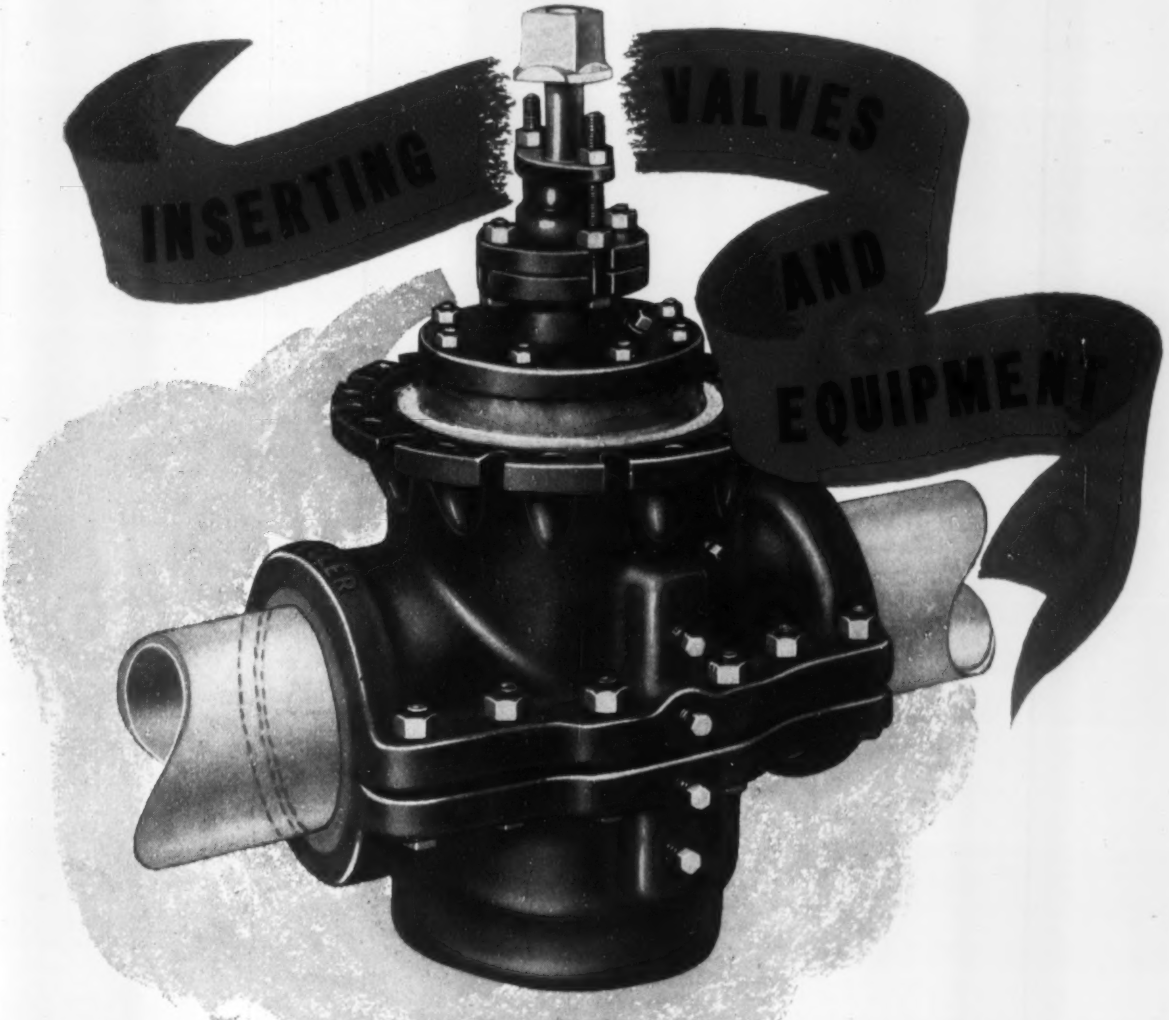

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Quickly and easily installed, these inserting valves are especially designed for installation and use where additional valving is required and a shutdown of the system would be impractical or hazardous.

When installed, the inserting valve may be operated like an ordinary gate valve to control a section of line. Mechanism of the valve is identical to that of standard Mueller AWWA Gate Valves and parts are interchangeable.

Inserting valves are available in 4″, 6″ and 8″ sizes. The size of the valve corresponds to the size of the main. All valves have full-size seat openings.

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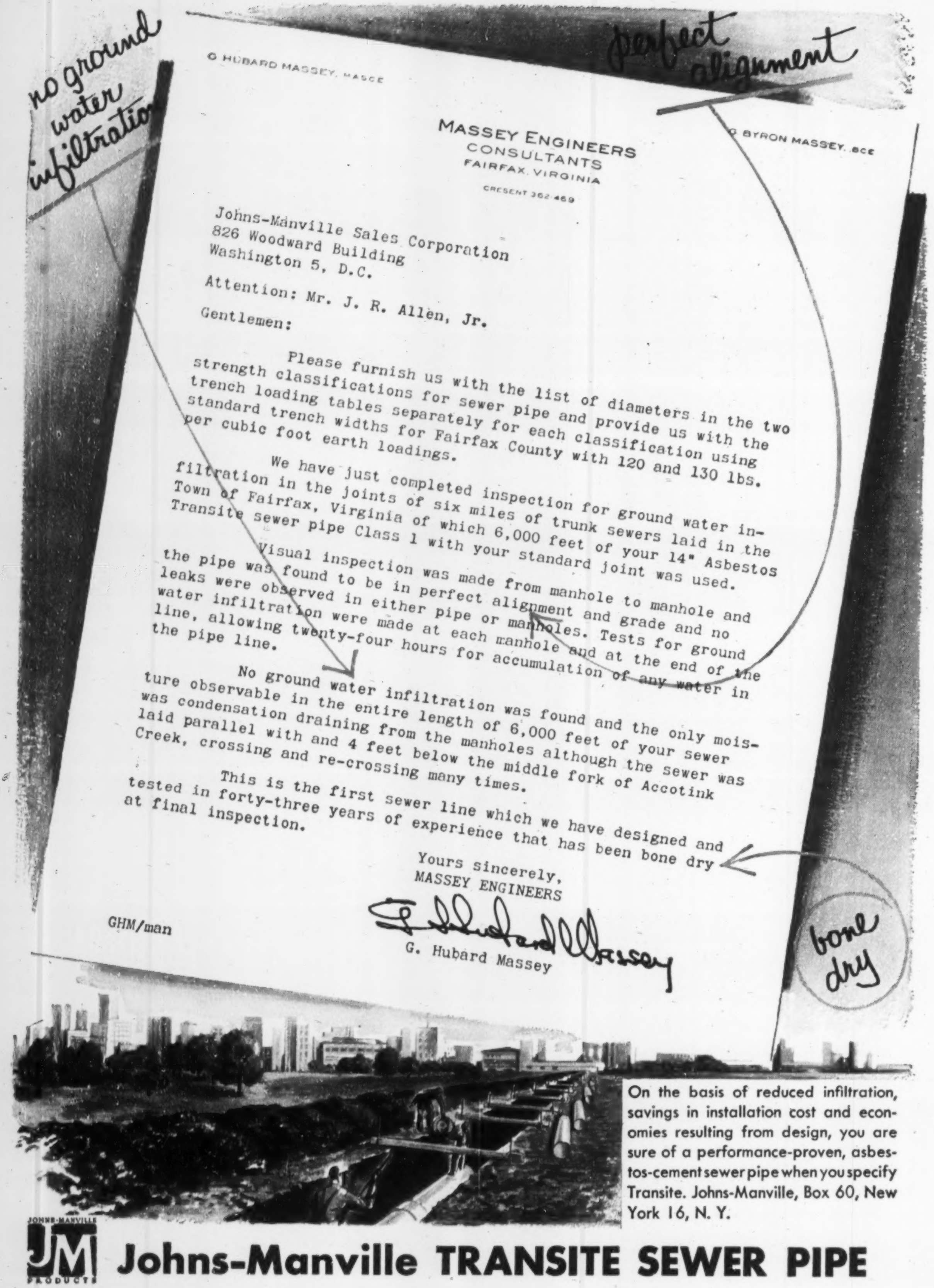

no ground water infiltration
perfect alignment
bone dry

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Johns-Manville Sales Corporation
826 Woodward Building
Washington 5, D.C.

Attention: Mr. J. R. Allen, Jr.

Gentlemen:

Please furnish us with the list of diameters in the two strength classifications for sewer pipe and provide us with the trench loading tables separately for each classification using standard trench widths for Fairfax County with 120 and 130 lbs. per cubic foot earth loadings.

We have just completed inspection for ground water infiltration in the joints of six miles of trunk sewers laid in the Town of Fairfax, Virginia of which 6,000 feet of your 14" Asbestos Transite sewer pipe Class 1 with your standard joint was used.

Visual inspection was made from manhole to manhole and the pipe was found to be in perfect alignment and grade and no leaks were observed in either pipe or manholes. Tests for ground water infiltration were made at each manhole and at the end of the line, allowing twenty-four hours for accumulation of any water in the pipe line.

No ground water infiltration was found and the only moisture observable in the entire length of 6,000 feet of your sewer was condensation draining from the manholes although the sewer was laid parallel with and 4 feet below the middle fork of Accotink Creek, crossing and re-crossing many times.

This is the first sewer line which we have designed and tested in forty-three years of experience that has been bone dry at final inspection.

Yours sincerely,
MASSEY ENGINEERS

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GHM/man

On the basis of reduced infiltration, savings in installation cost and economies resulting from design, you are sure of a performance-proven, asbestos-cement sewer pipe when you specify Transite. Johns-Manville, Box 60, New York 16, N. Y.

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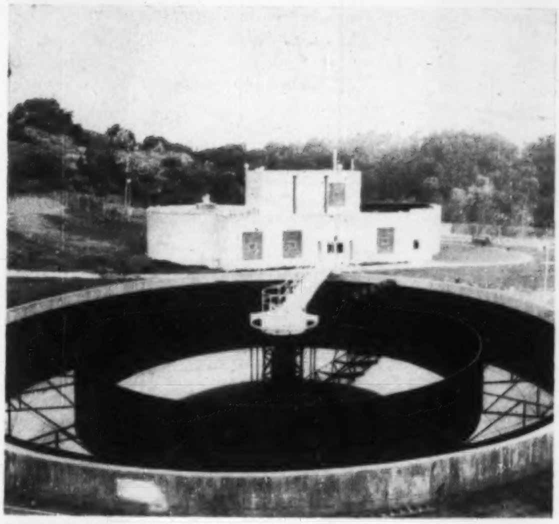
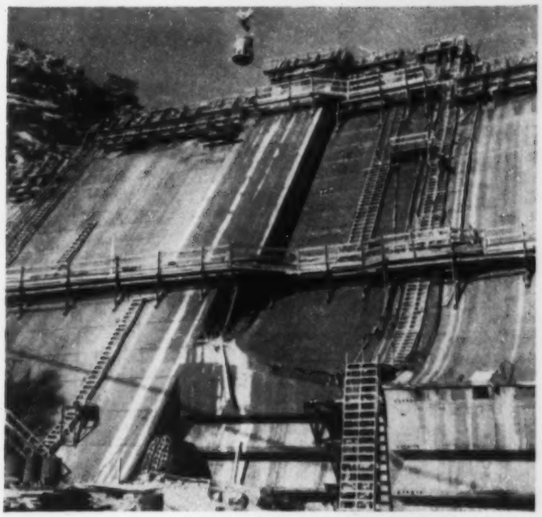
Johns-Manville TRANSITE SEWER PIPE



COORS-GOLDEN PLANT (Colo.) features pressure flotation before thermophilic digestion treating brewery and town waste.



CONCRETE POURING on the $12-million dam for Denver's Reservoir No. 22 is due for completion later this year.

Weather Evaluation Board, will weigh possible benefits and harmful effects of weather modification. Those actively concerned with seawater desalting include workers on nine federally sponsored research projects, financed well within a $525,000 congressional appropriation. Solar energy and electrical membrane demineralizers are two means of desalting being given attention, with emphasis on lowering costs.

The French have completely designed and await financing for a thermal-differential power plant to utilize temperature gradients of the sea off French West Africa. Its by-product would be fresh water. The plant planned would produce a 7,000-kw electric potential while distilling about 3.4 mgd of water. Over $2.5 million must be found before the plant can be built.

But the immediate problems of water supply must be answered by the conventional solutions; they can't wait for desalted sea-water or depend entirely on cloud-seeding efforts. Continuing drought conditions in the Southwest had Dallas, Tex., striking out for new surface water sources and conserving critical groundwater last year. Cities in the Texas Panhandle, meanwhile, organized into a regional water authority to develop the Canadian River (see also p. 146). And Waco, Tex., is teaming up with a Brazos River Authority to finance and build a needed water supply.

• Incodel plan fades—New York City will not be teaming up with any river authority for financing and building its future water supplies. The Incodel plan, for 4-state development of the Delaware River, is dead. The integrated scheme for full use of the Delaware prepared by consultants for the Interstate Commission on the Delaware River Basin may supply the basis for individual water supply developments of the future in this basin, but the full scheme as proposed is out. Supported by Delaware, New Jersey and New York, the $500-million scheme (first phase only) was opposed in Pennsylvania.

Pennsylvania chose to leave the whacking up of the Delaware River with the U. S. Supreme Court, where it has been since the 1931 decree that gave New York City 440 mgd from the stream and reserved decision on further diversions. It is time now for further diversion, since New York—still wanting to avoid the polluted Hudson—must bring in still another new source by 1965. Bereft of the Incodel plan, New York lost no time in mourning but rather pushed its petition, already before the Supreme Court, for a raising by 360 mgd the 1931 limit, to permit construction of its $140-million third stage development on the Delaware.

And 1953 was a year of progress in this important court case. The court's special master conferred repeatedly with engineers representing New York, New Jersey and Pennsylvania. Upshot of these pretrial conferences was a new release formula for the 360-mgd source New York wants at Cannonsville, N. Y., a formula that will benefit both New Jersey and Pennsylvania by better low-flow regulation. Out of the conferences came also a deal which had New Jersey's legislature wipe off the books an eighteenth century law prohibiting Pennsylvania from ever damming the Delaware. Now, Pennsylvania may build a reservoir on the stream whenever it cares to, and New Jersey will be pleased to share in its cost, plus its water.

Thanks to the pretrial conferences of the master with the engineers involved, the petition before the court right now stands a good chance of receiving favorable action. And a procedure new in water law seems to have developed.

• New materials, new methods—Possibly the most obstreperous youngster in the generally staid field of waterworks construction last year was plastic pipe. And a lot more will be heard from it. There have been estimates that plastic pipe had grown from infancy five years ago to a $20-million factor in the pipe field last year; another estimate is that 20% of all pipe now made in sizes up to 2-in. is plastic. So far, it is a factor only in service lines—not mains. Carefully laid and subject to no more than 100 psi for cold water service (heat softens it) plastic pipe competes in cost and in service with copper, according to those who have used it.

First use of fly-ash in a major eastern dam was on Baltimore's Liberty Dam, completed last year. Using 92 lb of fly-ash for every 3 bags of cement the builders saved about $80,000 on a $4.9-million project—one of the larger concrete water supply dams of late. Fly-ash use meant low heat of hydration, increased workability, reduced segregation and increased later strength, according to Baltimore water engineers.

In Bellaire, Ohio, an infiltration gallery in gravel under the Ohio River began drawing good quality water last year. This latest application of an old

(Continued on page 146)

—but infrequently used—method of supplying water was built for about $10,000 per mgd of water supplied. It is good for 10 to 12 mgd.

In Omaha, Neb., a construction man had a bright idea. He proposed and used conveyor belt idlers for rolling lengths of 48-in. water main into an 80-in. liner-plate tunnel. It saved a lot of the usual jacking and hauling on skids, also helped alignment.

In a dozen water laboratories across the country a year-long test wound up last year on an analysis tool of vital significance to water suppliers—the membrane filter. With this new filter it is possible to collect, culture and ship bacterial samples; field crews could actually mail samples to control laboratories for analysis. Reports on experiences with the device should determine its effectiveness and its cost —and thus, its future.

• **Refuse disposal**—Composting retained the spotlight through 1953. It was the refuse disposal method most successful in capturing the imaginations of public works people. These people had still to use their imaginations, since as yet there was no commercially successful composting venture of note in the U. S. But they were willing to do a little imagining rather than face the onerous economic and practical realities of incineration, hog-feeding and landfills. Perhaps 1954 will be the year for establishment of a really sound composting operation; the Oakland, Calif., plant promises that a bigger and better operation will come out of its redesign. At least it augurs well for the future that the biological "mysteries" of composting have been dispelled. It remains now an engineering problem—one of materials handling. It shall be solved.

Some major water supply and sanitation projects

• **Baltimore—Liberty Dam** on the Patapsco River was completed in 1953, except for closure of the opening that now carries the stream past the site. This opening will be plugged early this spring, as soon as all new bridges and connecting roads upstream are finished. The $4.8-million dam, with its 584-ft parabolic spillway, will produce an 8.25-mi-long reservoir with a storage capacity of 43 billion gallons and a safe yield of 94 mgd. Four new bridges figure in the over-all project, all completed except one which is 90% finished. These range in length from 544 ft to 1,681 ft, and in cost from $340,196 to $1.3 million.

On August 20, 1953, the Bureau of Water Supply awarded an $11.6-million contract for construction of a 120-mg water filtration plant that is to be known as the **Ashburton Filtration Plant.**

• **Boston (Water)**—Two projects now under construction, and scheduled to be completed in 1954 are the **City Tunnel Extension,** a 7-mile, 10-ft dia water tunnel to cost $11.9 million, and an 8-mi, 48-in. steel pipeline to the **Blue Hills Reservoir.** The latter is currently under test, and will be put into service early this year.

• **Boston (Sewerage)**—Now under construction is the **North Metropolitan Relief Tunnel,** a 4-mile deep-rock tunnel, 10 ft in diameter and concrete lined, running from Chelsea to Deer Island. This one is about 30% complete.

Two projects firmly planned and slated to be put under contract this year are:

Boston Main Drainage Tunnel, a 7.5-mi deep rock tunnel, will run from Ward Street to Columbia Circle and thence to Deer Island. This will contain 2.5 miles of 10-ft dia and 5 mi of 11.5-ft tunnel. Plans and specifications are completed for this project and it will be advertised for bids early this year. One shaft is now completed on Deer Island, and the next contract will include the driving of two more shafts. Cost will be about $14 million.

South Charles Relief Conduit: Plans and specifications are completed for the first section, 9,000 ft of cast-in-place sewer conduit of modified horseshoe shape, 7.75 ft by 10.3 ft. This contract will be advertised early this year, with the remaining three sections following during the year. Total length of the conduit will be about 36,000 ft.

• **Canadian River, Tex.**—Eleven cities in the Texas Panhandle-South Plains area last November approved a proposed $85-million project to build **Sanford Dam** on the Canadian River and pump water from it to their municipal systems. Only one city, Littlefield, voted against participating. Amarillo voted for the project by a ratio of 100 to 1. No action has yet been taken by the Canadian River Municipal Water Authority in considering proposals for financing.

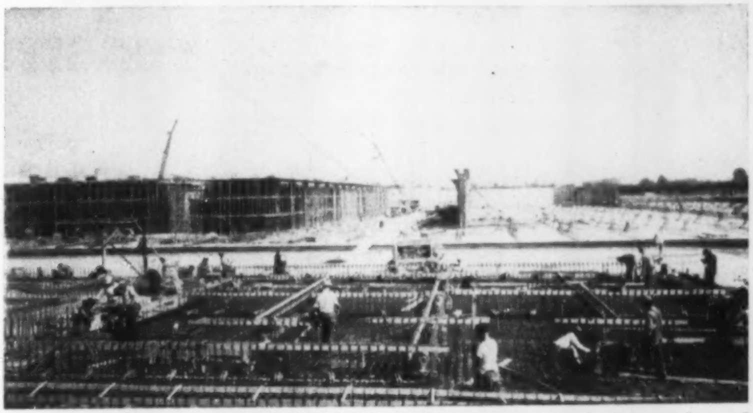
• **Chicago**—The Chicago Sanitary District's 1954 budget includes $7.9 million for new sewers, a pumping station, sewage treatment plant construction, and payments on existing contracts. Last year the Sanitary District awarded $2.6-million worth of contracts for intercepting sewer and treatment works, and spent $11.8 million for similar work, including one pumping station. Sixteen miles of intercepting sewers and one pumping station were completed last year.

• **Cincinnati**—The $4.8-million **Little Miami Sewage Treatment Works,** started three years ago, was completed last year, and contracts totaling $1.9 million were awarded for the 10-ft dia, 3,300-ft long **Mill Creek** outfall sewer and 2,100 ft of the **West Ohio River Interceptor.** The **Delta Ave. East-west Interceptor** also was finished last year, as was a $279,000-railroad site-clearing contract for the Mill Creek project. This year, the city expects to place $10.7 million of sewage works construction under contract. This includes, for the Mill Creek sewage works: twelve 11-ft dia by 31-ft deep digesters, control chambers, gas and heating building, and gas holders for $5 million; power, service and sludge disposal building for $4.5 million; and a $300,000 administration building. Also to be awarded this year are contracts for **East and West Ohio River Interceptor** construction, estimated to cost $875,000.

• **Cleveland**—Completed last year was a $2.1-million contract for increasing the capacity of the **Southerly Sewage Treatment Plant** from 36 mgd to 68 mgd. It included the installation of comminutors, detritors and presettling tanks. This year, about $3.1-million worth of work will be completed on the $5.2-million contract let in 1953 to change from a trickling filter treatment to an activated sludge treatment process. About $1.8 million also will be spent this year for additional vacuum filters and sludge incineration at the plant. The city also plans to spend about $2 million for more digesters, preaeration and grit-removal equipment at its **Westerly Sewage Treatment Plant.**

• **Denver**—The Denver Board of Water Commissioners started work in 1953 on enlarging the **Moffat Filtration Plant** from 75 mgd to 135 mgd. Expenditures in 1953 were $298,000 in the initial phase of the $3-million project. About $1.2 million will be spent on enlargement in 1954. Other major construction and expenditures in 1953 were **Reservoir Dam No. 22,** $3 million; **Tunnel No. 3** of the St. Louis collecting conduit, $528,000; and **Denver City pipe distributing** system, $1.25 million. Budgeted for 1954 are Moffat Filtration Plant, $1.2 million; Reservoir Dam No. 22, $5 million; Denver city pipe distribution system, $800,000.

• **Detroit (Sewerage)**—Construction contracts awarded last year by the Department of Public Works totaled $13.5 million, mostly on two large sewer projects. On the **Conant-Mt. Elliott Relief Sewer,** one $783,000 contract for about 1,500 ft of double 10-ft by 10.5-ft reinforced concrete box in open-cut will be finished this spring. Two adjoining sections—one-half mile of twin 11-ft dia circular sewers and two miles of 16.25-in dia circular sewers, both in tunnel—are sched-



NORTHEAST STATION, Detroit's 200-mgd water treatment plant was advanced substantially toward completion with $8.5-million worth of work done.

uled to be completed in March, 1955 at a contract cost of $5.4 million. This relief sewer starts at the Detroit River and eventually will be extended 7.4 mi through solidly built-up areas to Seven Mile Road. A second contract started last year is for 3.6 mi of 10-ft dia **Southfield Interceptor** sewer in tunnel. This $5.3-million contract is expected to be completed the latter part of next year.

- **Detroit (Water)**—Twelve contracts totaling $15.9 million were awarded last year by the Department of Water Supply in connection with the construction of water treatment facilities at its 200-mgd **Northeast Station.** At year's end an $8-million contract for the filter building, weir chamber, wash water building, switch house and office building was just getting under way. At the same time, the $2.3-million low-lift pumping plant structure was 20% finished, while a $3.7-million contract for settling basins and foundations for the chemical building was 75% finished. Thirteen construction contracts in connection with the plant were completed last year at a cost of $8.5 million. They included two booster plants, and 50,400 lf of 30-in. to 54-in. steel-cylinder, reinforced concrete pressure pipe. This year six more contracts are expected to be awarded for pressure pipe and plant construction with a total estimated cost of $4.2 million. Two other construction contracts, not connected with the Northeast Station, are expected to be awarded this year, at a total cost of about $2.9 million.

- **East Bay Municipal Utility District** of California—Major construction work in 1953 totaled $4.7 million. Most expensive project, completed at a cost of $1.2 million, was relining with concrete the 2.5-mi **San Pablo Tunnel** that carries water to San Pablo water filtration plant near Berkeley. One section of tunnel over fault was lined with 60-in. steel pipe, with concrete pumped into the area between the pipe and the tunnel walls. Other projects finished include a 20-mgd, $600,000 filter plant near Lafayette; a 3-mg reservoir at Rodeo; and a $500,000 modernization program for the **San Pablo Filtration Plant.** Work is progressing on excavation and construction of the 19.5-mg **Leland Reservoir** near Lafayette; excavation for the 50-mg **South Reservoir** near Hayward, world's largest tank-type reservoir, to be completed in 1955; and a $475,000 prestressed concrete 12-mg reservoir.

- **Honolulu**—Honolulu has completed 71 of the 100 projects called for in the 10-year, $22-million sewer construction program initiated in 1947. Value of completions: $10.9 million to date. Eight more projects, costing $2.1 million were in progress as 1953 ended, and an additional eight, estimated to cost $2.5 million are scheduled to go under contract in 1954. Meantime, for the next 30-year period, 100 additional projects are tentatively programmed at a total cost of about $55 million to provide sanitary sewers for the entire island of Oahu.

- **Kansas City, Mo.**—A 25% increase in water consumption during the last four years—largely for air conditioning—is causing the city to enlarge the capacity of its water system to 150 mgd by this summer, and to 210 mgd by 1956 or 1957. The existing steam-operated **Turkey Creek Pumping Plant** will be abandoned in favor of a new all-electric pumping station on higher ground for protection from floods. Last year the water department awarded 8 construction contracts totaling $4.7 million, and completed $250,000-worth of work. Largest contract was for a $2.1-million floodproof intake and low service pumping station, now 10% complete. This year the department expects to award $5.7 million in construction contracts in its $20-million expansion program.

- **Lake City, Wash.**—Work costing about $1.5 million was carried out during 1953 in the Lake City Sewer District just north of Seattle. It consisted entirely of lateral sewers.

- **Los Angeles**—Completion of the new **Eagle Rock Reservoir** and the first two units of the **Eagle Rock-Hollywood Conduit** was accomplished in 1953 by the Los Angeles Department of Water and Power to make the city's first major connection with the **Colorado River Aqueduct.** The 68-in. pipeline has a capacity of 171 mgd. Completion of the 85 mg reservoir and the 6.5-mi section of the conduit will enable Los Angeles to use larger quantities of its share of Colorado River water. Estimated cost of the entire project is $9 million.

Upper Stone Canyon Reservoir, with a capacity of 163 mg, was completed during the year at a cost of $2.5 million.

Also completed during 1953 was an improvement program to bring up to city standards the services of a former private water company purchased by the city. Included in the program was the construction of the new **Green Verdugo Reservoir,** with a capacity of 32 mg, a pumping plant and chlorination station. The improvement cost $2 million.

Water consumption reached an all-time high in Los Angeles during the year with an average delivery of 396 mgd, an 11% increase over 1952.

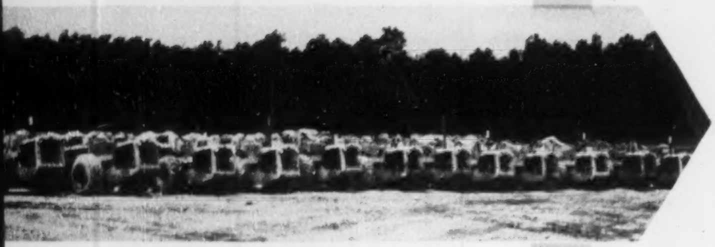
With ample supplies of water assured from three sources, the Los Angeles water system has been directed toward the provision of additional facilities for water distribution, storage and regulation within the city. To meet the ever-increasing demand for water, a construction program estimated to cost $83 million is planned for the next five years.

- **Miami, Fla. (Sewerage)**—The year 1953 saw the start of the city's $27-million sewage project. Contracts were awarded for intercepting sewers and force mains costing $6.7 million; sewage pumping stations, $2.5 million; **Biscayne Bay Force Main,** $2.0 million; Sewage Treatment plant, $9.2 million; **Virginia Key Outfall,** $1.7 million and an access road costing $210,000. Work began in September, is expected to take three years for completion.

- **Miami, Fla. (Water)**—The first phase of a 100-mgd softening and filtration plant is 95% completed. It is the **Alexander Orr, Jr. Water Treatment Plant** being built for a present capacity of 40 mgd at a cost of $2.5 million. Its well-field source of supply is about 75% finished and will cost $100,000. Construction of 45,000 ft of supply and feeder mains—30 and 48 in.—costing $1.7 million was

(Continued on page 150)

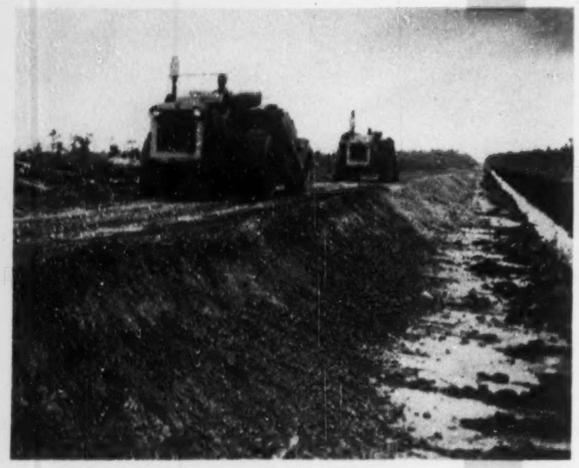
"All other hauling methods more expensive" report Blythe Brothers



14 D Tournapulls handle long hauls "cheaper than trucks" on railroad job

BLYTHE BROTHERS COMPANY, Charlotte, North Carolina, contracted with the Marine Yards and Docks Division of the U.S. Navy to build 28.85 miles of single track railroad for a southeastern training base. Of the million cubic yards involved in the project, most difficult phase was construction of a 250,000-yd. fill over 5 miles of swamp. Fill, mostly sand and sandy loam, was made 20′ wide on top, averaging 5′ in depth, with a 40′ base.

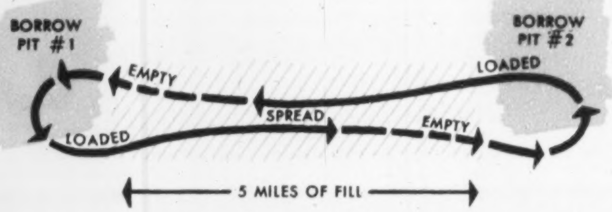
Blythe Brothers studied and field-tested many types of equipment before beginning work on this section. Trucks were tried, but didn't work out because they couldn't get through the soft footing without constant tractor assistance. Hauls were too long for crawlers. Fills were too narrow for most self-propelled scrapers. Then Blythe Brothers tried D Tournapulls. These did the trick. "D's" had the ability to pull through the soft fill and turn on its 20-ft. width. Top haul speed of 28 mph made them economical even on hauls of 2½ miles or more. So, the Company rented 6 "D's" to add to their own fleet of 8 . . . assigned all swamp work to the 14 Tournapulls and several draglines for sidecasting.



Two major reasons for selecting D Tournapulls were their ability to "go-anywhere" in soft, spongy footing, and make high-speed turns on narrow fills. Most units were driven to job under own power from cities 60 to 70 miles away.

2 loads hourly on 10-mile cycle

With only 2′ to 3′ to the water table in the borrow pits, and despite rain nearly every day, the rubber-tired units



At start of project, draglines mucked out 2½′ on both sides of fill, wasting it along sides. The "D's" then started at one end of embankment area, placed 3′ of sand lift along entire 5-mile stretch. "Figure-8" operation was then started with units hauling material from borrow pits at both ends of fill.

FOR LOWEST-NET-COST-PER-YARD

consistently loaded 6.5 pay yards of root-laced dead sand. Working a "figure-8" pattern totaling 10 miles, each "D" delivered 2 loads per 50-minute hour. Haul and return speed averaged 12 mph.

Says Project Manager George F. Thibodeau, "Other hauling methods were studied, including trucks, and actual field trails were made. All were found to be more expensive than the D Roadster operation."

Excellent planning and supervision

Efficiency was increased, field engineers report, by Blythe Brothers' excellent initial planning, plus a rigidly-followed maintenance program. Despite adverse conditions, the haul road was maintained and sprinkled constantly. Every detail of the job showed alert supervision to help equipment deliver maximum output.

Ask your LeTourneau-Westinghouse Distributor for literature on how to increase *your* job efficiency. He will be glad to help you, any time. He will also demonstrate Tournapulls on your job. Make a test. You'll find the 7-yd. 122 hp "D's" have ample capacity to work profitably in pusher fleets. They also have the self-loading ability to economically handle scattered finishing and other one-man odd jobs. Every dirtmoving job needs at least one "D" as a "handy man".

Push-loaded, Tournapull with 1-ft. sideboards, gets 6½ yds. of dead sand and sandy loam in less than 45 seconds. The "D's" worked a "figure-8" cycle, loading at both ends of the 5-mile fill.

Spread, taking only 15 seconds, is made on the run at 20 to 25 mph. According to Blythe Brothers, the "D's" have delivered 3 loads per hour under best conditions over the 10-mile, 2-load cycle . . . averaging 18 mph on haul and return.

Tournapull—Trademark Reg. U.S. Pat. Off. DP-528-RR

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Above or below grade masonry
ARMOR COAT

ARMOR COAT prevents above or below grade penetration of water in masonry constructions—such as basements, reservoirs, tunnels, etcetera. In addition to water repellent qualities, it is recommended for beautification of homes, commercial and industrial buildings.

During the war ARMOR COAT was used in waterproofing and decorating below grade military workings in England. Many types of paint were tried. ARMOR COAT was the only paint that combined excellent decorative features with high resistance to such severe water pressures below grade.

Above grade
SILINITE

SILINITE is the revolutionary water repellent discovery for use on porous masonry. This clear Silicone base compound gives longlife protection. Concrete, stucco, brick, tile, flagstone and sandstone, new or old, are inexpensively treated with SILINITE and retain their original color and texture. It penetrates, becoming a part of the masonry.

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538 Commercial St., Glendale, Calif.
Please send me complete information on how to keep porous masonry "Dry as the Desert."

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Company ____________
Street Address ____________
City ______ Zone ____ State ______

98% complete by the end of the year. New work for the coming year includes 9,000 ft of 24 and 30-in. cast iron distribution mains at a cost of about $440,000.

• **New Orleans, La. (Sewerage)**—The Sewerage & Water Board plans on constructing 8,200 ft of 31.5, 37.7 and 50-in. ID steel pipe sewer main this year at an estimated cost of $370,000. The pipe has been ordered, but construction contracts have not, as yet, been awarded. Another large project planned for 1954 will be increasing the capacity of an existing pumping station at an estimated cost of $250,000, and the construction of an additional 48-in. discharge main from the plant to the Mississippi River, to cost about $800,000. Major projects completed last year include 37,830 ft of 12-in. and 24-in. cast-iron sewer mains at a cost of $420,000; a $100,000 pumping station; four automatic pumping stations, each costing $12,000 and designed to serve about 600 dwelling units in remote areas; and 27,000 ft of 24- and 30-in. steel pipe sewer force mains to serve the section of the city east of the Industrial Canal. Total cost of this work was $707,000, including a $74,000 contract for laying the pipe under the 450-ft-wide canal at a depth of 44 ft below mean water level.

• **New Orleans, La. (Water)**—Nearly $3 million is expected to be spent this year by the Sewerage and Water Board for water mains and purification plant improvements. Largest items are 28,230 ft of 50-in. and 3,300 ft of 30-in. welded steel pipe to serve the immediate north section of the city, at a total cost of $2 million. Modifications and new construction at the water purification plant will cost about $900,000. Last year 10,800 ft of 50-in. welded steel water main was completed at a cost of $590,000. It is the third section to be laid in a 32,150-ft water main to serve the north and east sections of the city where major development has taken place in recent years.

• **New York (Sewerage)**—During 1953, work was continued on final projects necessary to remove pollution from recreational waters. This included completion and starting of operation of the 10-mgd **Port Richmond Project** in Staten Island, the letting of a $13.9-million contract for a five-mile tunnel in connection with the 80-mgd extension of the **Bowery Bay Plant** in Queens and the letting of a $2.7-million contract for the intercepting sewers of the 15-mgd **Oakwood Beach Project** in Staten Island. Contracts for the two treatment plants in question, and additional intercepting sewers will be ready for early letting in 1954. Planning for the second stage program, for the treatment of sewage in other than recreational waters, is being continued.

• **New York (Water)**—The Board of Water Supply continues to let contracts at a rate of nearly $10 million a year in the program to complete by 1956, Stages I and II of its **Delaware River Development.**

Stage I has been completed to the extent that the yield from **Rondout Reservoir** has been supplemented by that from the new **Neversink Reservoir,** making a total of 235 mgd. Some additional work on the finishing touches of the **Neversink Control Works and Spillway** remains to be done. The **Neversink Dam** is a rolled-fill embankment, 2,820 ft long, and 195 ft high above the bed of the river, and its concrete-caisson core wall extends to a depth of 145 ft below the bed. It will impound 34.7 billion gallons of available storage.

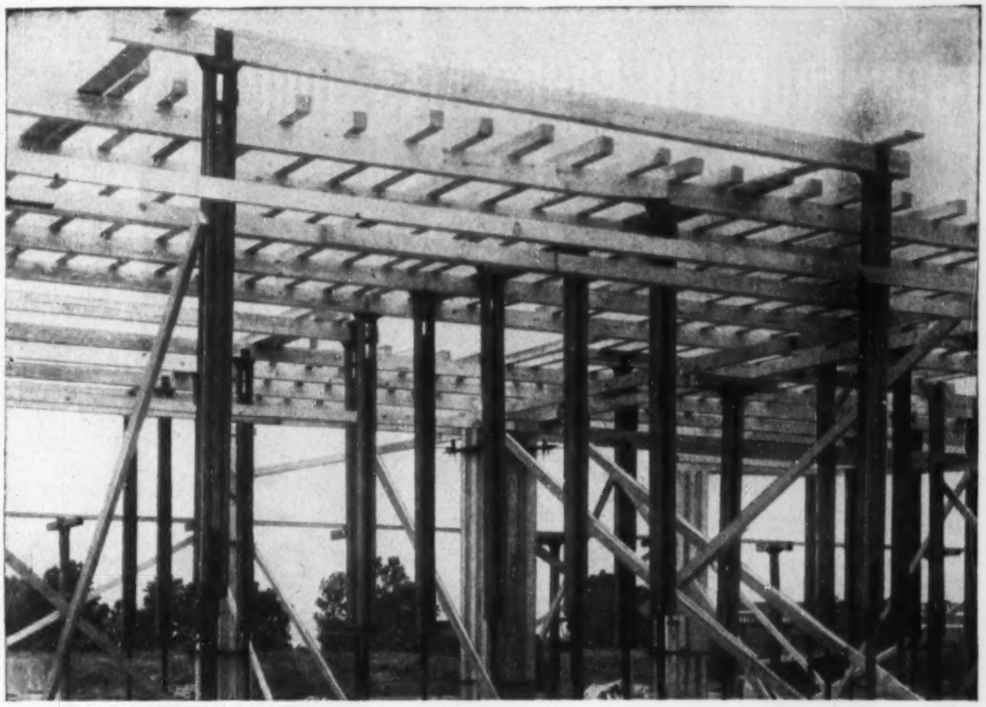
The 5.5- mile, 10-ft dia **Neversink Tunnel** to Rondout Reservoir has been completed, and now feeds a 36,000-hp. turbine of the Central Hudson Gas and Electric Corp. to make use of energy of the drop between the two reservoirs. The total cost of the Neversink Dam, Reservoir and Tunnel is about $49.5 million.

Stage II, the **Pepacton Reservoir** on the East Branch of the Delaware River and the 26-mile, 11.3-ft dia tunnel to Rondout Reservoir is about 90% complete. Work is in progress on the dam spillway, control works, reservoir clearing, substitute highways, tunnel lining and power plant. All work on the second stage will cost about $98.7 million, and is 75% finished. **The Downsville Dam** is a rolled-fill embankment, 2,450 ft long and 204 ft high above the bed of the East Branch, and its concrete core wall extends to a depth of 100 ft below the bed. It will impound 143.5 billion gallons of available storage.

• **Philadelphia (Sewerage)**—The $80-million sewage collection and treatment program for elimination of dry weather sewage flow to streams and rivers was, at the end of 1953, 66% complete as measured by contracts complete or awarded. During 1954, contracts for $14 million are scheduled for award. This amount is approximately 16.5% of the total cost of this program.

Work on the $25-million treatment program for the three plants is 84% completed. During 1954, contracts totaling $3.9 million, or 16% of the total cost are scheduled for award. Emphasis will be on the 136-mgd **Southwest Plant,** which is scheduled for operation late this year. At this site contracts totaling $1.58 million, or 17.2% of the total cost of $9.2 million are scheduled to be awarded during 1954. Work on the 140-mgd **Southeast Sewage Treatment Works** will progress to the extent of contracts scheduled to be awarded totaling $2.5 million.

(Continued on page 152)



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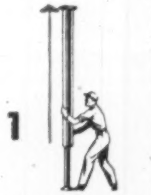
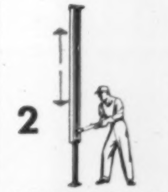


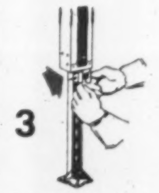
1

Lift outer wood section to height desired



2

Adjust up or down to smallest fraction



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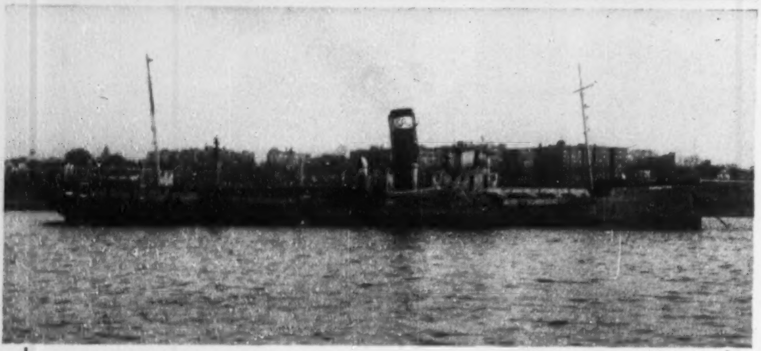

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or 34% of the $7.4-million project cost.

Work on the $55-million collecting and intercepting system is 58% complete, and during 1954, work on 13 of the 28 systems will proceed. Contracts totaling about $10 million will be awarded. For four of the systems the contracts will be in excess of $1 million for each. The major work will be on the **Poquessing Creek Intercepting System** where there is scheduled to be awarded the amount of $2.29 million, or 84% of the total cost of this 47,000-ft intercepting sewer.

The Sewers and Drainage Program covering sewers for new housing, to relieve unsanitary conditions, to permit paving and for reconstruction of old sewers proceeds as is necessary. During 1953 contracts were awarded that totaled $6.4 million. It is anticipated that in 1954, the total will be $8.5 million. The largest portion of this total for this year is an estimated $3.05 million for new housing sewers.

The $48-million **Storm Flood Relief** program made up of projects to relieve flooding in times of storm by construction of alternate or larger drainage facilities, was 21% complete at the end of 1953. This figure is based upon contracts completed or awarded. During 1954 there is scheduled to be awarded contracts amounting to $4.57 million. This amount for 1954 covers three projects, the largest of which is the **Frankford Creek Flood Control Project**, on which $3.01 million of contracts are scheduled to be let, or 40% of the total cost of the Frankford project.

• **Philadelphia (Water)**—The $50-million waterworks program for purification, pumping and storage was, at the end of 1953, 32% complete as measured by contracts complete or awarded. During 1954 the amount of $11 million, or 22% of the total program is scheduled to be awarded for construction.

This work will be distributed among eight projects of the waterworks program. The largest item is the $7.4-million worth of construction on the new **Torresdale Pretreatment Plant and Rapid Sand Filters.** A start will be made this year on the $17-million, 300-mgd plant that if necessary will produce 450 mgd with safety.

Work on the water distribution system comprising distribution system replacements and rehabilitation; reinforcing mains and smaller distribution mains will proceed as necessary. During 1953 contracts totaling about $1.4 million were awarded. For 1954, it is anticipated that contracts totaling $3.2 million will be awarded. This increase represents an acceleration in the program for replacement and rehabilitation, and for reinforcing mains to better the distribution.

• **Phoenix, Ariz.**—A $2-million 30-mgd filter plant at **Squaw Peak** on the city's outskirts was started in 1953. This plant accounts for part of $5 million the city is spending on supply and delivery systems. Other continuing projects: a $348,000-expansion of present filter treatment facilities at **Granite Reef Dam** on the Verde River and a $2.4-million pipeline from the Squaw Peak plant to the city distribution network.

• **Portland, Me.**—The Portland Water District made extensions to its system, and carried on a replacement program. One of the replacements was an 8-in., 6,800-ft submarine line of ball-and-socket-joint cast iron pipe laid between Mackworth Island and Great Diamond Island in Casco Bay.

Currently under construction is another submarine line from Veranda Street, Portland to Andrews Avenue, Falmouth, a distance of 2,600 ft, replacing a 12-in. steel line that is leaking badly.

• **Portland, Ore.** (Sewerage)—Two new sewage pumping stations in mid-town Portland brought this $18-million disposal system nearer completion and Willamette River pollution to its lowest in decades.

• **Portland, Ore.,** (Water)—City water supply for Portland's growing needs gained 75 mgd when officials turned into reservoirs the flow of a new 100-mgd, 25-mile steel pipeline that replaces a line built in 1895. Completion in mid-December was behind original schedule due to the steel strike and bad weather. Cost was $5 million.

• **Providence**—Phase I, of the **Blackstone Valley Project** has been completed and is in full operation. This stage included $3.3-million worth of sewer interceptors and the $2.8-million **Bucklin Point Primary Sewage Treatment Plant.**

Phase II of the project has been started. It includes the extension of the present interceptors, new interceptors and possibly increasing the plant primary facilities from 20 mgd to 48 mgd if this is shown to be warranted by the increased flows. The field work has been completed and some contract plans on the interceptor work are ready for bidding very early this year. There are about seven miles of intercepting sewer ranging from 15 in. to 48 in., and one mile of 48-in. sewer in deep tunnel planned. Most of this work is firmly planned for a 1954 start, with completion scheduled for 1955.

Phase III which includes secondary treatment facilities will be the final development in the program, but no concrete plans for early operation on this stage have been made.

• **Sacramento**—Work has progressed rapidly on a $5.5-million, 54-mgd sewage plant for the Sacramento metropolitan

(Continued on page 154)

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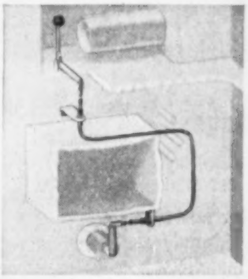

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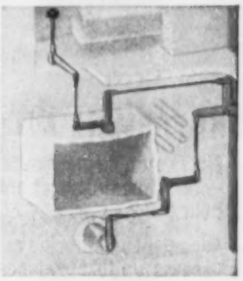

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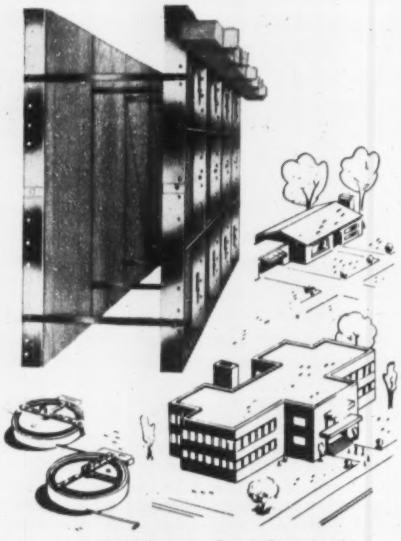

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area. As the year ended the project was 75% completed and operation is expected some time next summer. The project, started late in 1952, is being financed by a $4.4-million bond issue supplemented by a $1.1-million allocation from the state. Readily adaptable to expansion, the plant is designed to accommodate the anticipated flow of sewage from Sacramento and five suburban districts until at least 1970.

- **San Diego**—**The San Diego Aqueduct,** second barrel of the 71-mile line connecting the **Colorado River Aqueduct** with the San Diego area, is 68% complete. The $16.5-million project is being built by the U. S. Bureau of Reclamation under Navy jurisdiction with money to be repaid by local interests. The new work will bring the aqueduct capacity to 170 cfs.

Sutherland Dam, a San Diego city water project, is now 80% complete. The multiple arch dam, originally started in 1927, was stalled in 1928, not to be resumed until 1952 under a $3-million contract. Project cost totals $6.5 million. The 161-ft-high dam will impound 29,000 acre-ft of water.

- **San Francisco**—Work is still under way on contracts totaling $2.6 million that will complete the 60-in., 50-mgd transmission main from Burlingame on San Francisco's peninsula to Sunset Reservoir in the city. During 1953, $1.1 million was spent for supply and feeder mains and large distribution mains, and $1.4 million went for special projects, which included completion of two fluoride treatment installations, alterations to central pump stations, and completion of **Lake Merced Pump Station** (33 mgd capacity, pumping to **Sunset Reservoir**) and **Mt. Davidson Pump Station.** Rough grading has been completed for the city's highest reservoir—**Summit,** being erected on Twin Peaks at elevation 800. September, 1954, is the scheduled completion date. Work done in 1953 totaled $6.6 million.

- **Seattle**—Work was brought to substantial completion in 1953 on the first $88,000 units of a $25-million sewage disposal system planned for construction over a ten-year period. Contracts will be awarded this year for trunk sewers costing about $500,000.

Engineering work was started in 1953 by the **Southwest Suburban Sewer District** for the first $250,000 units of a $5.8-million sewer system in an area adjacent to the city.

- **Southern California Water**—Total expenditure for construction by Metropolitan Water District of Southern California during fiscal 1953-54 was more than $21 million out of a $52-million program. About 75% of the $21 million was under contract by the end of last year. Major contracts completed or under way include: the 60-in. **Garvey-Ascot Cross Feeder,** 5.64 miles through the cities of Los Angeles, Alhambra, and Monterey Park, costing $12.6 million and completed last November; a 1,500-acre **Garvey Reservoir** costing 3.9 million and expected to be completed six months ahead of its April 1, 1955, contract completion date; 8.05-mile pipeline from **Garvey Reservoir** to Victoria Street, awarded in two contracts totaling $8.3 million and scheduled for completion in September of 1954.

• **Spokane,**–Spokane hopes to call bids and build an interceptor in 1954 that will be the last major section of its $3.7-million sewage disposal project in 1954. Remaining are two smaller lines. Bids for three pumping plants in the system, the disposal plant in the northwest part of the city, should be called during 1954, with a fall construction start possible.

• **Washington, D. C.**–Continuing in its $40-million, 10-year expansion of the water-supply system, the Washington Aqueduct of the Washington District, Corps of Engineers, U. S. Army, has completed the construction of a 30-mg clear-water basin at the **Dalecarlia Filter Plant.** Excavation has been completed, plans and specifications for the construction contract are in the final stage, and bids will be requested in April for the construction of a 450-mgd, $7-million filtered-water pumping station including intake works and connecting conduits at the Dalecarlia Filter Plant. Plans and specifications for an $8-million raw-water supply project at Little Falls are nearing the final stages. The **Little Falls** project involves a 500-mgd, remote-controlled, raw-water pumping station; a low dam across the Potomac River; and a mile-long, 10ft-dia, finished-bore tunnel. The Washington Aqueduct is buying separately the pumps, motors, switchgear, cranes, valves, traveling screens and piping for installation in these two pumping stations, and 75% of this equipment is under contract at the present time. A high-pressure, 48-in. transmission main approximately two miles in length is ready for advertisement, and plans and specifications are being prepared for a new chemical-feed building at the **McMillan Filter Plant,** construction of which is scheduled to begin in June, 1954. Design of a new chemical-feed building at the Dalecarlia Filter Plant will start in the near future.

• **York, Pa.**–Operations have continued in the construction of the $4-million sewage treatment plant with superstructure substantially complete and mechanical equipment falling in line. 15,362 cu yd of the 17,000 cu yd of concrete to be used are in place, and the plant was 86% complete structurally and mechanically as of Jan. 1.

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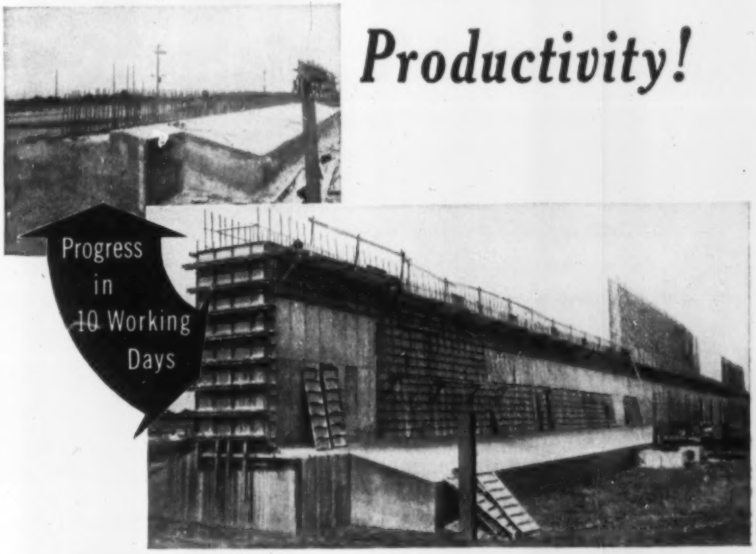

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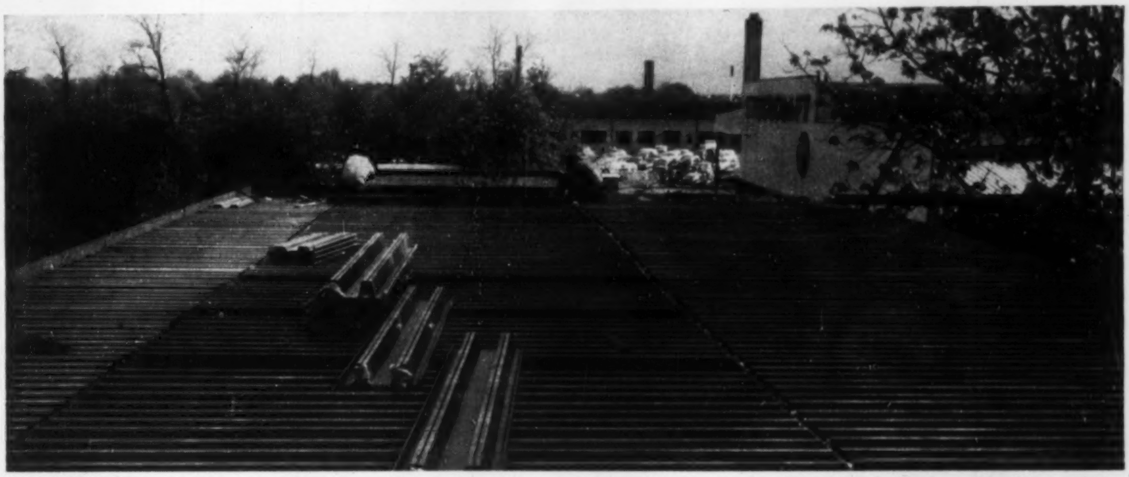

HALF-FINISHED ROOF shows the under panels with reinforcing members filled with glass fibers already in place. Further insulation will be added in the channels and then the upper panels will be placed. The completed assembly provides a flush deck and subfloor.

Eight-family apartment building for $40,000

Out of Rossmoyne, Ohio, comes a report of the Steelcraft Mfg. Co. taking a shot at the low-cost apartment building field. Just how good their aim is remains to be seen, but here's what they have and hope to have.

The pilot model building is a two-story, all-steel structure designed to offer a total of 3,560 sq ft of living space to eight families. Although this first building ran a little high in cost, the manufacturer estimates that once in mass production, the entire living unit complete with steps, porches, etc., and land should run slightly over $40,000.

The construction of the new building is based primarily on an insulated "sandwich" wall panel developed by the company. It consists of a thin-walled steel or aluminum shell—3 in. thick overall—enclosing a layer of glass fiber insulation. Inside the shell are reinforcing webs separated from the two external sheets by combination cork and neoprene gaskets to minimize metal-to-metal contact.

The basic price per sq ft of the insulated metal wall panel runs from approximately $1.50 to $2.00, depending on the type of material used.

(Continued on page 160)

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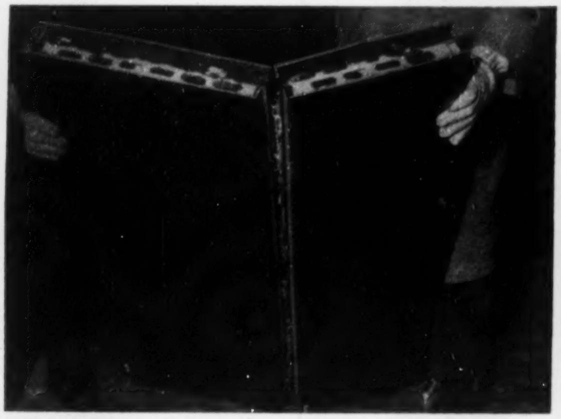

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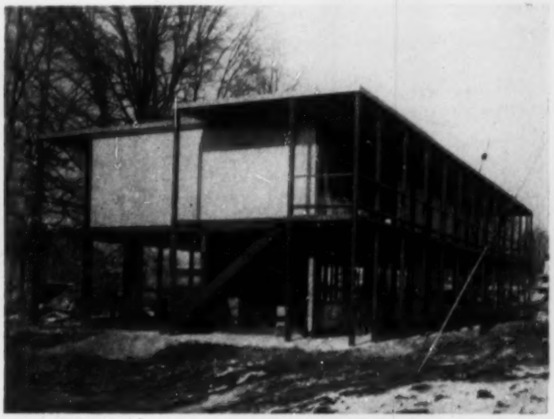

PRESENT STAGE of construction shows paneled exterior.

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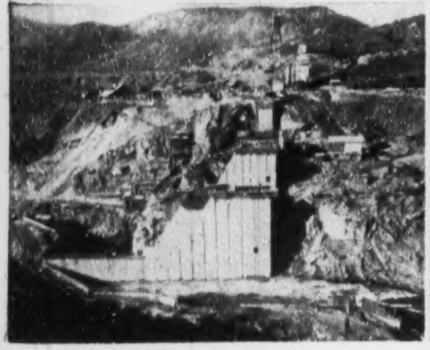
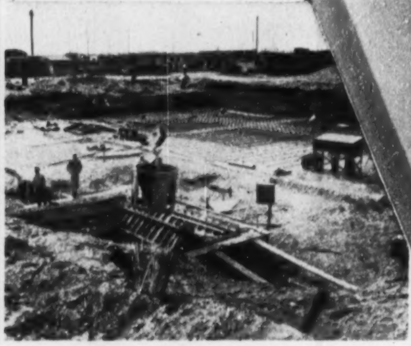
Heat and Power Plant, Anchorage, Alaska. Footings and foundation for Eielson AFB plant, using Protex concrete, poured under adverse weather conditions.

International Air Port, San Juan, Puerto Rico. This construction on filled-in marshland, used Protex air entrained concrete for smoother surface, easier finishing and improved placeability.





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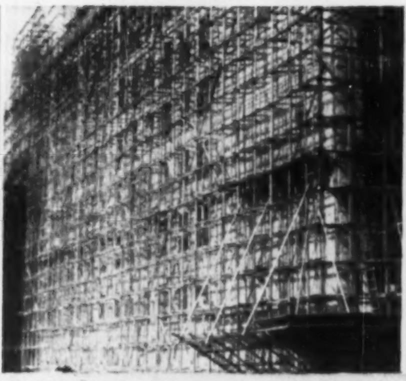
Rio Lampa Dam, El Salvador. This giant project used Protex air entraining agent for high quality concrete under normally unfavorable labor and climatic conditions.



Fuji Bank Building, Tokyo, Japan. Economy in this new bank building was realized in initial cost and time—and appearance was permanently improved with Protex concrete.

San Juan Housing Project, Puerto Rico. This new project, constructed on filled-in marshland, used Protex air entrainment for easier placement, reduced segregation and better surface texture.

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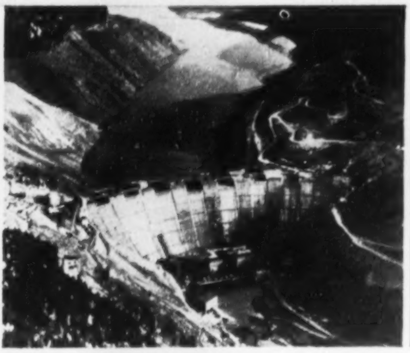
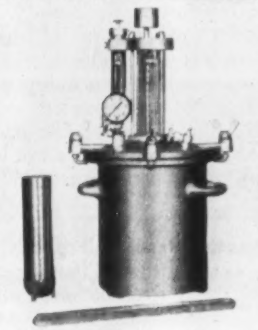
No matter the direction one looks—foreign or domestic—projects large or small—Protex is truly the "Outstanding Name in Concrete." Rely on the true name, PROTEX, for controlled air and controlled yield. Protex is scientifically manufactured and laboratory controlled by a leading industrial organization with an enviable reputation for reliability and quality for over thirty-two years. The evident superiority of Protex is attested by projects *all over the world!* Whether you build dams or concrete blocks, you'll find Protex lowers cost whether figured per sack of cement or per cubic yard of placed concrete. Your customer will get a more durable, better looking job. Now multiply these advantages by millions of yards of concrete, and you'll see why others use **Protex Air Entraining Agent**—you, too, can profit with Protex, the "world's leading air entraining solution." Phone, write or wire today for full technical information!

Hungry Horse Dam, Mont. Over 3 million cu. yds. of Protex concrete, selected for its consistent controlled air quality and proven economy, with *no yield loss in placed concrete.* Comparative tests at the project proved that, regardless of claims or names, none were as effective as **PROTEX.**



Protex Air Meter has world wide acceptance because it's fast, it's accurate. No special training needed. Small amount of water, direct reading. Fully approved—only $98.50 complete F.O.B. Denver. Send for descriptive literature—use coupon!



AUTOLENE LUBRICANTS CO.,
Industrial & Research Division,
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Denver 9, Colorado.

☐ Please send complete information on Air Meter.

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Mix Co., Las Vegas, Nev. ● Western Equipment Co., Boise, Idaho; Spokane, Wash.; Idaho Falls, Idaho ● Western-Tractor & Equipment Co., Regina, Saskatchewan
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STEEL PANEL wall in place.

Panels can be furnished either fluted or flush in steel, galvanized or aluminum and in various surface finishes.

The panels are made in standard 2-ft width and lengths up to 20 ft, but 16-in. or other special widths are available.

For the relatively high per sq ft cost, you get insulating value. According to a series of tests conducted by the Case Institute of Technology, the heat transfer coefficient or "U" factor of the panels is 0.15. This is roughly equivalent to an 8-in. masonry wall, furred, insulated and plastered.

Further, the design of the panels shows the deflection under a live load of 25 psf to be less than 1/240 of span.

• **Construction**—The wall panels are attached to the structural framing with a special speed rivet or sheet metal screw and, during construction, can be removed for relocation or alteration without damage.

Roof and floor construction consists of two mating panels that, when installed together, form a flush deck on both sides. The bottom panel is made up of a flat sheet and two longitudinal reinforcing members of trapezoidal cross section. The upper panels are similarly constructed except that the trapezoidal reinforcing members are not as deep.

When both panels are properly installed, the reinforcing members intermesh—much like the teeth of two opposed rack gears. Glass fiber insulation is contained in the reinforcing members of the under panels and further insulation is added between these members before the upper panel is applied. The difference in depth of the trapezoids leaves considerable room for this.

Joints on both roof and wall panels are similar in that they are interlocking and weatherproof. STEELCRAFT MFG. CO., ROSSMOYNE, OHIO.

Plug's gripping action simplifies roof bolting

Steel expansion anchors for roof bolting in the tunneling—offer simplified operation because of the development of a new plug. Plug-Lock eliminates the need for straps, nuts or staked ears on the bolt.

The plug is cast with depressions that are clutched by two fingers of the anchor. It is this gripping action that holds the plug in position for fast starting and stops the anchor's outer assembly from dropping down the bolt during installation or tightening operations. MINING PRODUCTS DIVISION, EQUIPMENT CORPORATION OF AMERICA, 2013 ST. CLAIR AVE., CLEVELAND 14, OHIO.

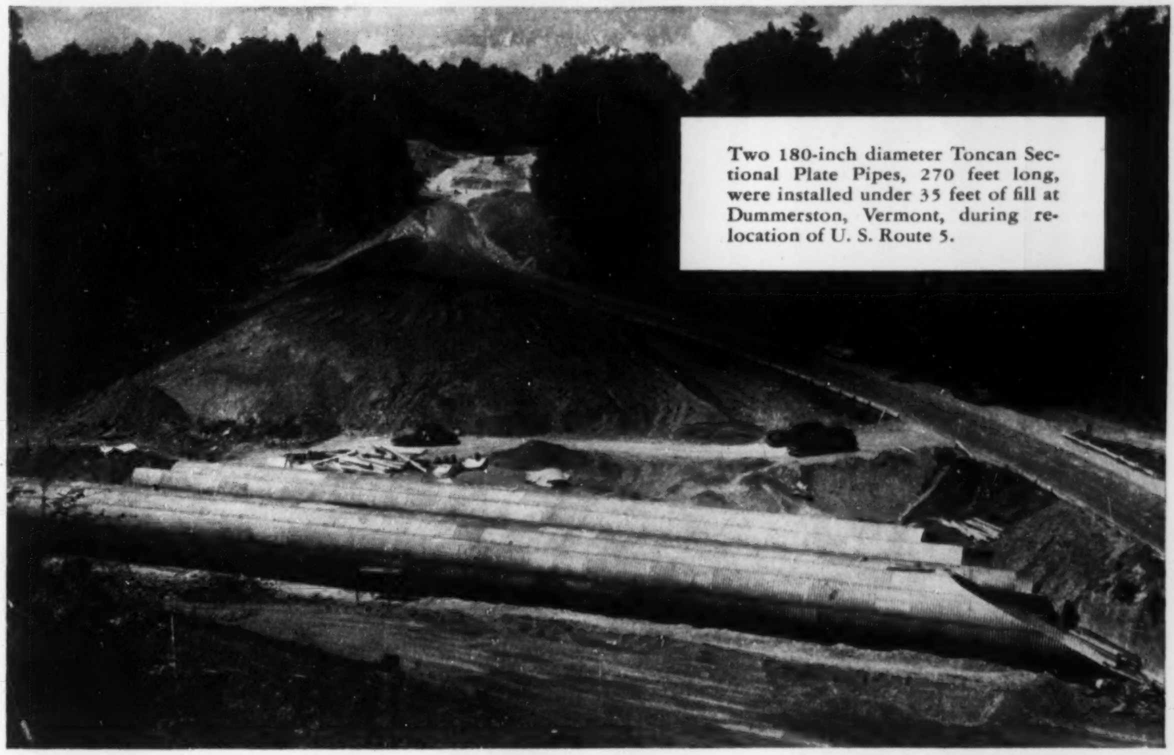
Primer for rusty metal banishes sandblasting

A new rusty metal primer permits protective topcoatings to be applied to industrial equipment without surface preparation. It's especially useful where rust removal by sandblasting is impracticable because of spark hazard and the danger of contaminating nearby equipment—or because of cost, time and small area involved.

In a test case, several industrial tanks were treated with the primer—after removal of loose rust and scale. Then two layers of anti-corrosion coating were applied. After 18 months of service, this protective topcoating showed no visible signs of breakdown, according to the manufacturer.

The primer is not recommended for new or bright metal. SURFACE ENGINEERING CO., INC., 1535 BARWISE AVE., WICHITA 1, KAN.

(*New Products continued on p. 162*)



Two 180-inch diameter Toncan Sectional Plate Pipes, 270 feet long, were installed under 35 feet of fill at Dummerston, Vermont, during relocation of U. S. Route 5.

TONCAN DRAINAGE PRODUCTS

Economical • Easily Installed • Last for Years

Even big jobs like this Toncan Sectional Plate Pipe installation are easy to handle . . . easy to erect in any weather with unskilled labor.

A single order covers all required materials—bolts, nuts, washers, and pre-cut, pre-punched Toncan Sectional Plates. The galvanized bolts feature a combination head and convex washer forged to fit the valley of the corrugation and provide full bearing on the plate. A special galvanized concave washer is used under the galvanized hex nut on the crest of the corrugation. This assures uniform bearing and prevents gouging or scraping of the galvanizing on the plates.

Once in place, you can forget about Toncan Sectional Plate Structures. They flex with shifts in subsoil and fills, maintain their original water-carrying capacity, do not spall.

Toncan Sectional Plate Structures give you years of trouble-free service because they are made of Republic Toncan Iron . . . containing twice as much copper as ordinary copper-bearing steels and irons plus just the right amount of molybdenum to make the copper most effective in resisting rust.

Get "specs" and data from a Toncan Drainage Products Manufacturer listed below. Or write to

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Export Department: Chrysler Building, New York 17, N. Y.

Toncan Drainage Products Made From Republic Toncan Iron or Republic Copper Steel include

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BOISE, IDAHO
BERGER METAL CULVERT CO., INC.
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BLUEGRASS PIPE & CULVERT CO.
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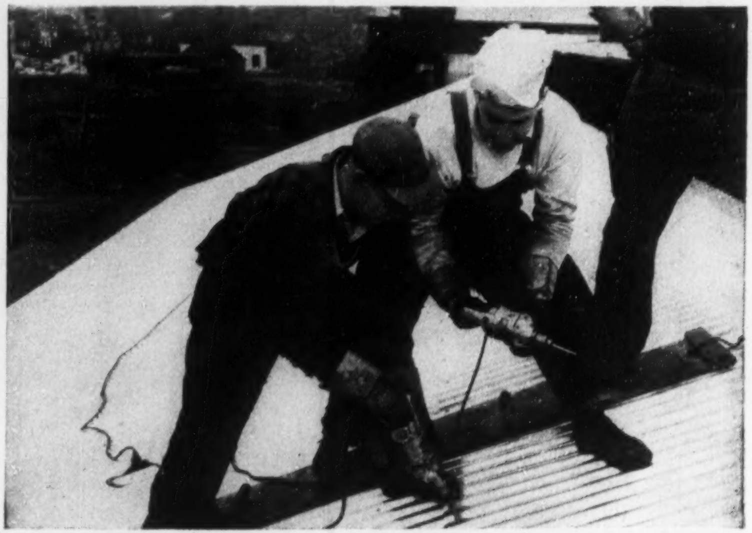


Aluminum roofing made thinner

Aluminum roofing and siding only .024 in. thick is now available for installation where narrow spans in the roof support structure do not require the extra high beam strength of the usual .032 in. material.

The light roofing sheet is supplied

(*Continued on page* 164)

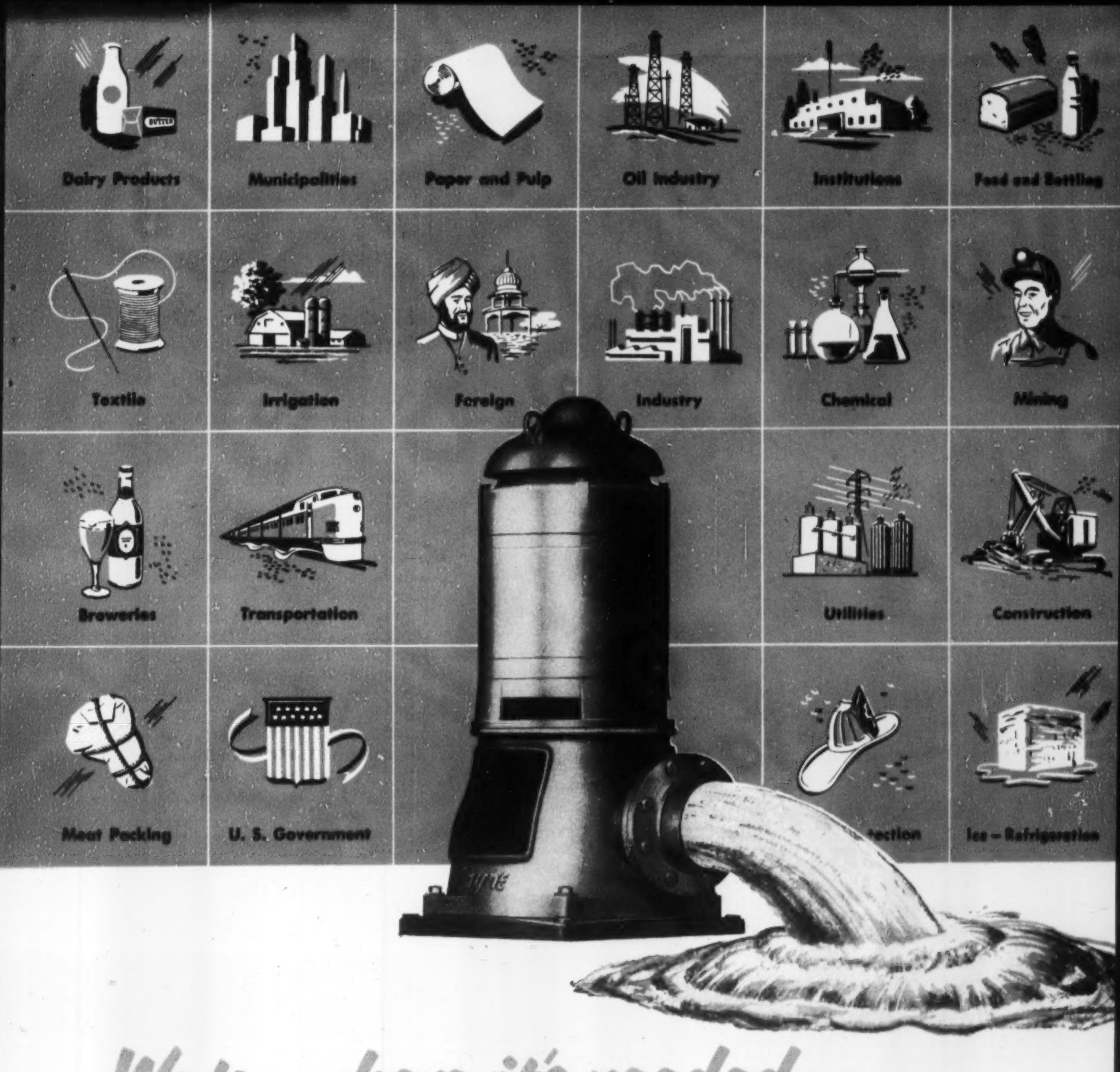
Table of design loads—corrugated sheet (.024 in.)

Purlin Spacing	Recommended Design Load p.s.f. Uniform	Purlin Spacing	Recommended Design Load p.s.f. Uniform
7'6"	17.1	5'0"	38.6
7'0"	19.7	4'6"	47.6
6'6"	22.8	4'0"	60.2
6'0"	26.8	3'6"	78.7
5'6"	31.9		

Weight and coverage table (.024 in.)

	Sheet Length in Feet	Square Feet per Sheet	Pounds per Sheet	*Approximate Number of Sheets per Square (100 sq. ft.)
ROOFING	5	14.48	6.02	6.90
	6	17.37	7.24	5.76
	7	20.27	8.45	4.93
	8	23.16	9.65	4.32
	9	26.07	10.86	3.83
	10	28.94	12.07	3.45
	11	31.85	13.28	3.14
	12	34.72	14.44	2.88
SIDING	5	13.92	5.82	7.18
	6	16.74	6.98	5.97
	7	19.53	8.15	5.12
	8	22.32	9.31	4.48
	9	25.11	10.48	3.98
	10	27.90	11.64	3.58
	11	30.70	12.80	3.26
	12	33.48	13.97	2.98

* To allow for side and end laps in estimating, add approximately 16% for roofing and 9% for siding.


Dairy Products
Municipalities
Paper and Pulp
Oil Industry
Institutions
Food and Bottling
Textile
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Water where it's needed

In every realm of water consumption Layne is on the job. The world's industrial giants in manufacturing, petroleum, textiles, chemicals, paper—wherever water is used in quantity—rely on Layne engineered and constructed wells and pumps. Cities and farms, too, turn to Layne for dependable, economical water supplies.

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Layne installs better water systems at less cost because Layne does the whole job. From initial surveys and test drillings to completed system and followup maintenance you deal with only one organization. Layne's 70 years of world-wide experience in every field of water supply equips us to serve you best.

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Suggest you
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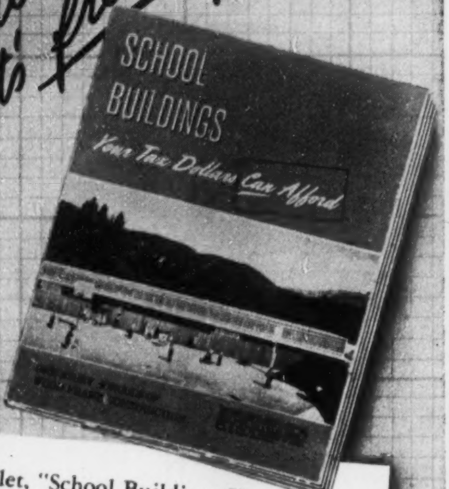

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with corrugations ⅞ in. deep and a 2.67-in. pitch—identical to the .032-in. standard product; however, it can be used with substantial economies over the heavier material. All fasteners and erection methods are applicable to both gages of metal. Aluminum Co. of America, 805 Alcoa Bldg., Pittsburgh 19, Penna.

Mixer payload increased by better weight distribution

The center of gravity on the new 5- and 6-cu yd Willard truck mixers has been moved forward and lowered by combining the pedestal and 90-gal water tank. Thus greater payloads are possible while still remaining within legal limitations.

The mixer has been designed to mount on ten-wheelers with a wheelbase of 175 in. or more. Power for the drum is supplied by a rear side mounted Chrysler Six industrial engine. Equipped with fluid drive, this engine is said to offer exceptional operational control when used with standard Willard features, the combination throttle and over-center drum brake.

Concrete placement is eased with a ratchet controlled chute that measures 14 ft when extended. Willard Concrete Machinery Sales Co., Lynwood, Calif.

Waterproof coatings look for bigger jobs

Armor Laboratories is now entering the construction market with its line of water repellent coatings. During the last two decades production has been confined primarily to residential commercial and industrial applications.

One of the coatings—applied like paint to porous masonry construction above or below grade—decorates as it protects against water damage. This double-duty product met some of its severest tests in England during World War II, when it was used for bomb shelters and below grade military workings. In addition, it has been used in the Far East to combat climatic conditions (100 to 300 in. of rain a year).

A second product is an invisible coating that protects any unpainted above grade masonry structure, new or old. It's recommended for use on concrete, stucco, brick, tile, flagstone and sandstone. Application reportedly does not effect color and texture of the surface being treated. Armor Laboratories, Glendale, Calif.

(*New Products continued on page 167*)

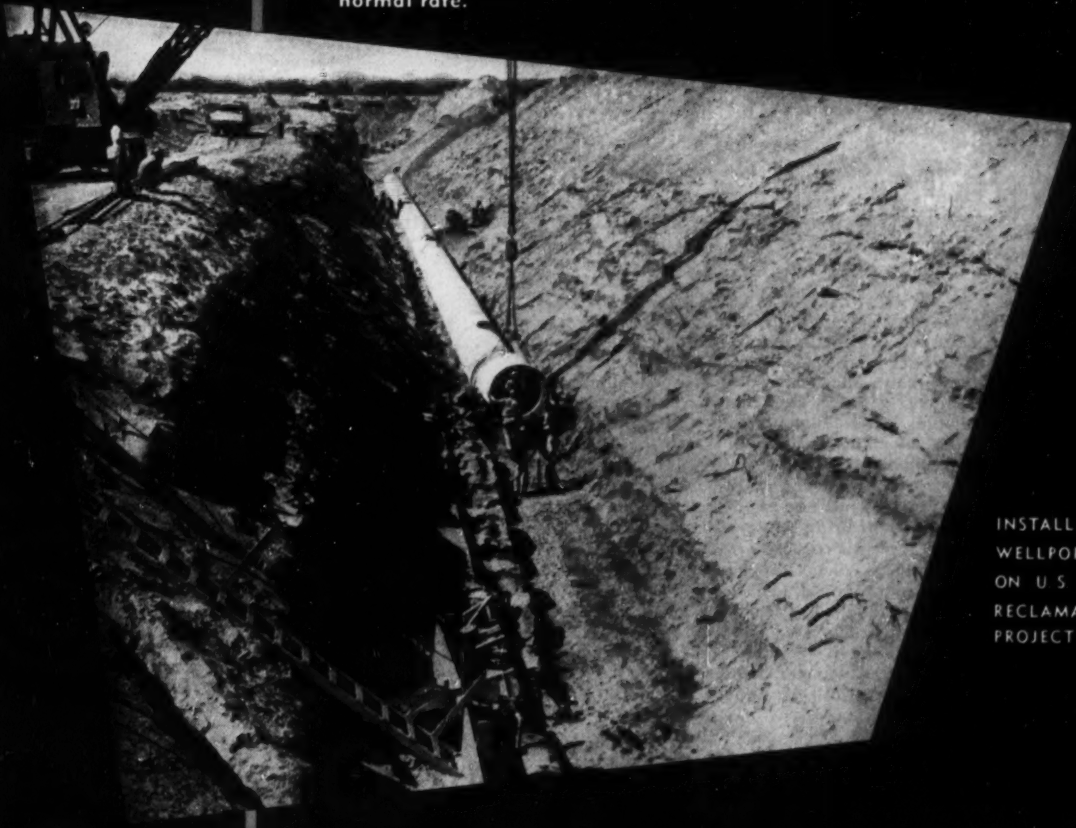
Treacherous soil made SAFE in deep cut in fine wet sand

Treacherous soil conditions were encountered in this excavation for the installation of a Pipe Line Siphon under the bed of the Gila River for the U. S. Bureau of Reclamation Gila Project at Wellton, Ariz.

For a quarter of a mile the cut was 25 ft. deep in extremely light and fine sand, with little cohesive quality of the particles.

Ground Water at subgrade, and excavation into the wet material caused continuous sloughing of the dry soil above.

So the contractor installed a Stang Wellpoint System . . . the cut was quickiy and economically stabilized . . . and pipe laying proceeded at a normal rate.



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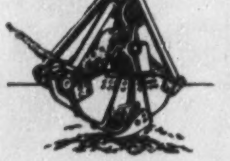
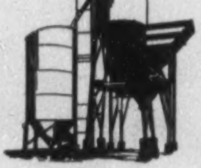
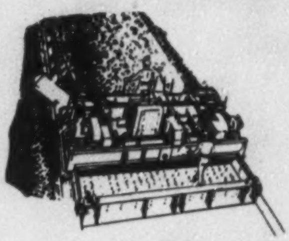

CLAMSHELL BUCKETS


AGGREGATE AND CEMENT BATCHING PLANTS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ONE of the most important benefits of "Complete Package" operation is a drop in your maintenance and down time costs that shows up on your profit sheet. When *all* your concrete paving equipment belongs to one family, *preventive* maintenance becomes standard practice. One Blaw-Knox trained man can service all your "package" equipment, and while he services one machine, he automatically checks over all the others to stop trouble before it starts.

When you do need parts, there's no time or effort wasted running down what you need. Just one phone call to your nearest Blaw-Knox distributor will bring you genuine factory replacement parts usually from his complete stock.

In addition, you get these other "package" advantages . . . every piece of equipment you need, from forms to paver to finisher, in a package *to fit your specific job,* and designed to work together. You can get the exact "package" you need all on one order, in one shipment, with only one financial contact, and backed by one responsible manufacturer. Talk to your Blaw-Knox distributor today about all the advantages of the one-source "package" paving system.

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Textured plywood bows as new siding material

Western fir plywood manufacturers are making their bid for a greater share of the siding market with an outdoor building panel called Texture One-Eleven.

Although the use of exterior plywood for siding is not uncommon, the industry hopes that offering a new panel more closely keyed to present fashions in the building field will multiply the sales volume for plywood siding.

The face of the new panel is marked by parallel grooves ¼ in. deep and ⅜ in. wide spaced 2 and 4 in. on centers. The intergroove surfaces have a slightly rough face characterized by natural wood markings of grain, small knots and restricted knot holes.

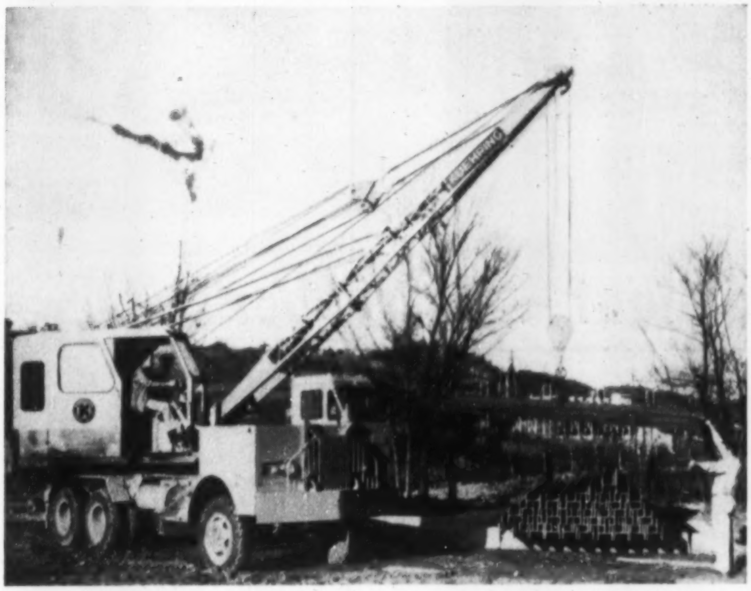
The industry believes that the new product will give architects and builders a low cost medium that will yield the same fashionable visual effects of custom-made jobs.

In one test project undertaken, application costs of Texture One-Eleven were estimated at 4¢ a sq ft compared with figures of up to 20¢ for tongue and groove lumber required to get a similar effect.

The panel is ⅝ in. thick, rabbeted at the edges, and is available in two widths—16 and 32 in. net. Standard lengths for the new siding material are 8 and 10 ft.

The panels are scheduled to go into production by six firms in Washington and Oregon, while three others already have the panels rolling off their lines. NORTHWEST DOOR CO., TACOMA, WASH.; ST. PAUL & TACOMA LUMBER CO., 1220 ST. PAUL AVE., TACOMA 2, WASH.; SIMPSON LOGGING CO., 1065 STUART BLDG., SEATTLE 1, WASH.

(New Products continued on page 170)



Koehring's 205 gets a new carrier

The recently improved version of the Koehring Model 205 excavator (ENR Sept. 17, 1953, p. 114) is now available on a rubber-tired undercarriage. As a crane it is rated at 15 tons capacity and has a top travel speed of 32.6 mph.

The excavator can be adapted to clamshell, dragline, shovel and hoe work and for special high lift crane service, straight boom jibs lift may be added. These jibs are available in 15, 20, 25 and 30-ft lengths with cable and counterweighted hooks. Safety boom limit stops and power lowering are included as standard equipment.

The carrier has ten forward speeds from a low of 2.03 mph to a road speed of 32.6 mph and two reverse speeds of 2.04 and 4.08 mph. Power air brakes are built into each of the four double-tired rear drive wheels.

In keeping with modern highway driving practice, front and rear turn signals are built into the chassis, as are standard driving lights.

The truck body for the 205 is equipped with two 8-ft outriggers provided with marker lights for night work. Koehring Co., 3026 W. Concordia Ave., Milwaukee 16, Wis.

LEADING CONTRACTORS USE McCarthy Drills

PUBLIC UTILITY AUGER DRILL

Bores holes from 4½" to 24" in diameter under sidewalks, roads, building foundations, railroad tracks, landscaped grounds, etc. Fithian Contracting Co., Youngstown, O., using McCarthy Public Utility Auger Drills, completes pipe line jobs, formerly taking weeks, in a few days.

SELF-PROPELLED HORIZONTAL AUGER DRILL

Will bore 6" and 8" diameter holes 120 feet horizontally at rate of six feet per minute maximum. Four individual, self-locking jacks maintain correct drilling level. In one day a New Castle, Pa., operator bored holes of various depths totaling 840 ft. through shale and sandstone, using this McCarthy Auger Drill.

VERTICAL AUGER DRILL

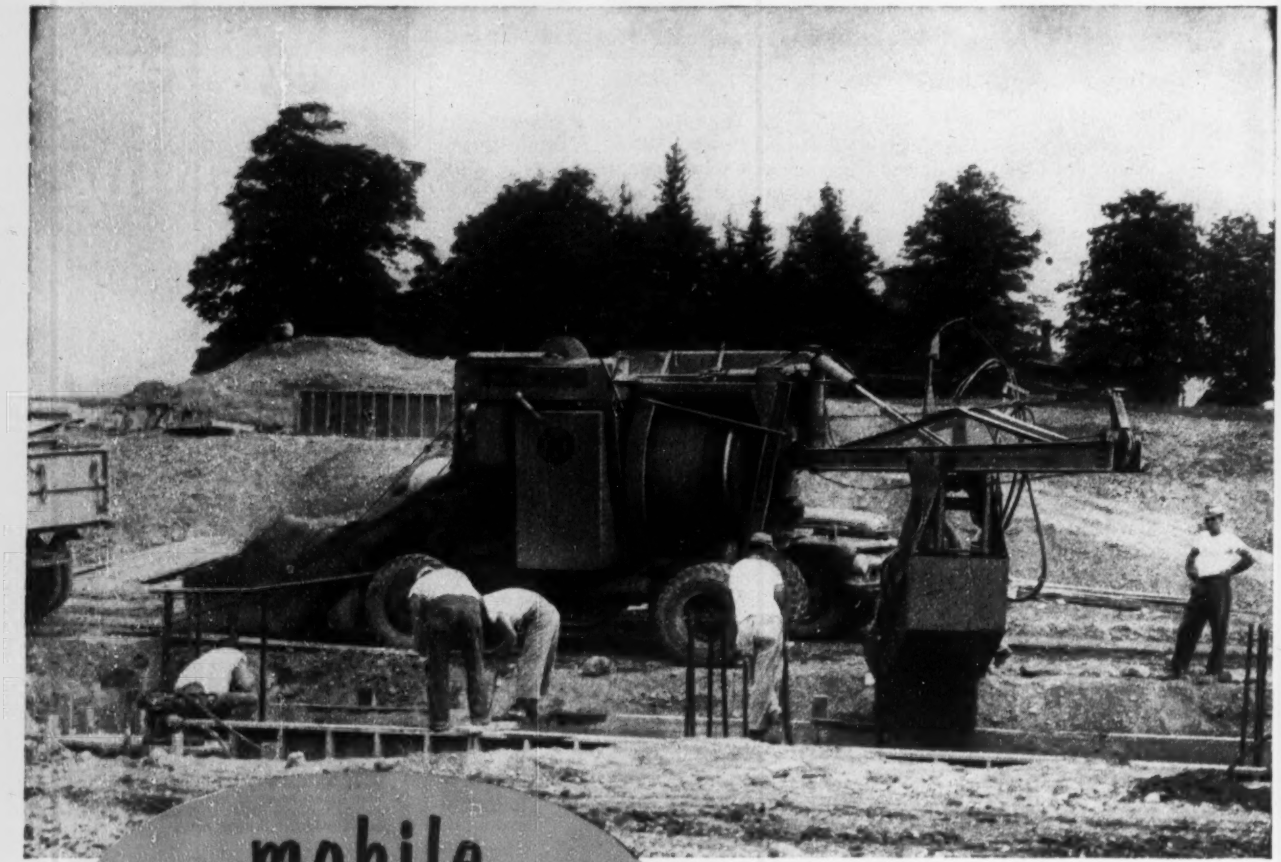
Operating men who have made actual on-the-job tests find the McCarthy Vertical Auger Drill a standout for mobility, stamina, ruggedness and versatility. On a 2-million dollar, 5-mile stretch of superhighway between Hubbard, Ohio, and Sharon, Pa., The Apex Powder Co., Canton, Ohio, cut blasting costs approximately 20% as compared to air, well or churn drilling. Cutting through two large areas of concentrated rock, 150 holes 15 feet deep were bored for each blasting pattern. 3,000 cubic yards of sand rock were moved at each blast. Due to the ruggedness and mobility of McCarthy Drills, there was no time lost. For further information, write Salem Tool Co. and our distributor will contact you.

SALEM

DRILLING EQUIPMENT
SINCE 1901

THE SALEM TOOL CO.

1900 S. SOUTH ELLSWORTH AVE.
SALEM, OHIO · U.S.A.



mobile concrete mix plant on rubber

Koehring 16-E *twinbatch* rides on pneumatic tires . . . works, travels on or off pavement . . . makes self-powered moves at 9 m.p.h. Its rubber-tired mobility increases productive work-time. Its high elevating boom discharges into overhead hoppers . . . pours concrete for buildings, pilings, culverts . . . or batches into trucks. Bucket on 60° elevating boom discharges at a height of 21 feet (higher with special boom). Boom also swings in a 160° arc . . . speeds pouring of floors, footings, highway and airport strips.

This versatile 16-E easily mixes and distributes over 50 cu. yds. per hour. 7-second skip hoist, split-second Autocycle mixing, and vertical syphon-type water tank all assure consistent, maximum-strength concrete at top mixing speeds. Get all the facts from your Koehring distributor . . . or write *Koehring Co., Milwaukee 16, Wis.*

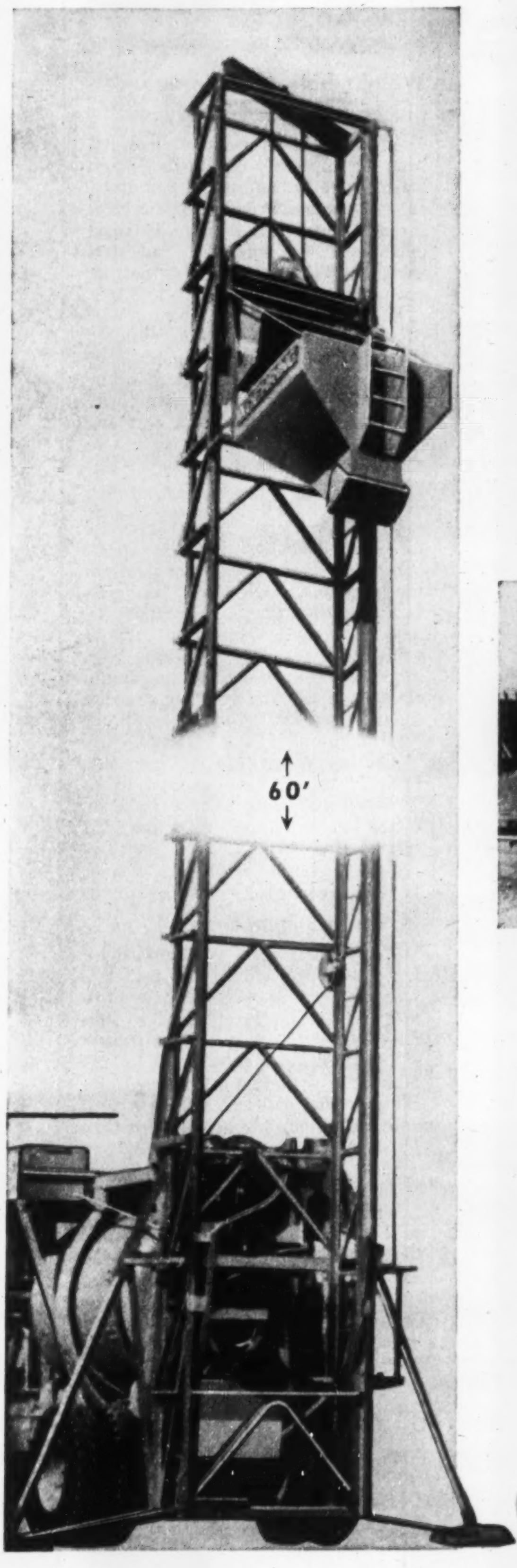
(Subsidiaries: JOHNSON • PARSONS • KWIK-MIX)

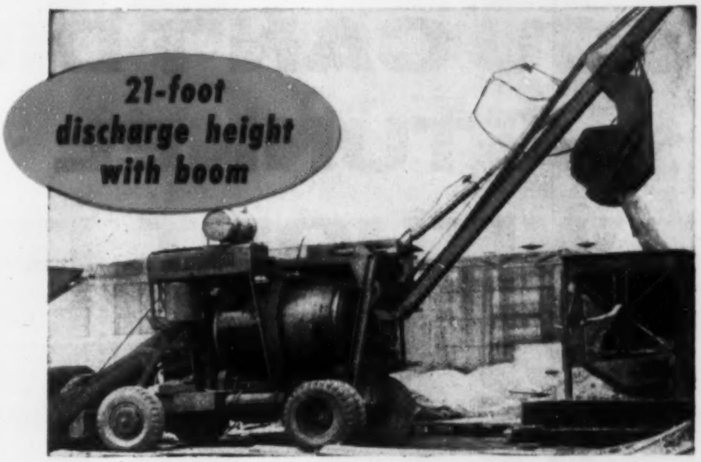
KOEHRING 16-E *twinbatch*®

48½-foot discharge height with tower

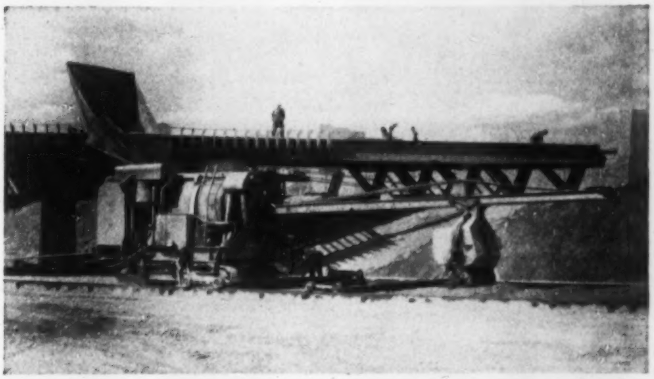
On the Koehring 16-E, the elevating boom is interchangeable with a 40 or 60-foot tower. This gives discharge heights up to 48½ feet for pouring high columns, piers, decks and upper floors. 21½-cu. ft. hoist bucket discharges automatically into 40 cu. ft. overhead hopper. Hopper is easily positioned (at 6-inch intervals) anywhere along face of tower. Tower is raised . . . or safely lowered into horizontal carrying position . . . by the same hydraulic ram used on the elevating boom.

K436

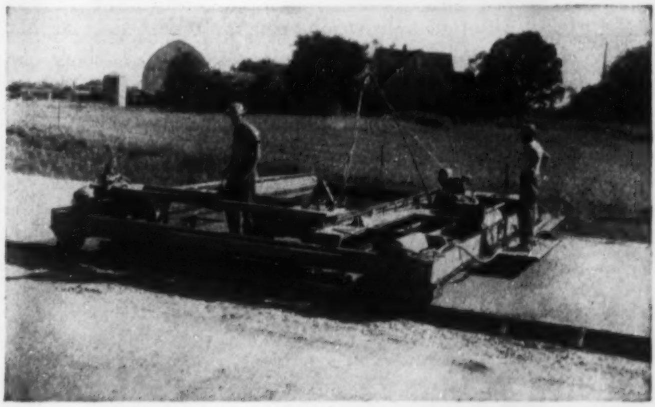




Koehring 16-E *twinbatch* is never "grounded". Bucket discharges anywhere along 25-foot elevating boom. Clamshell door on 24-cu. ft. bucket is hydraulically operated, opens or closes at any time for controlled discharge.

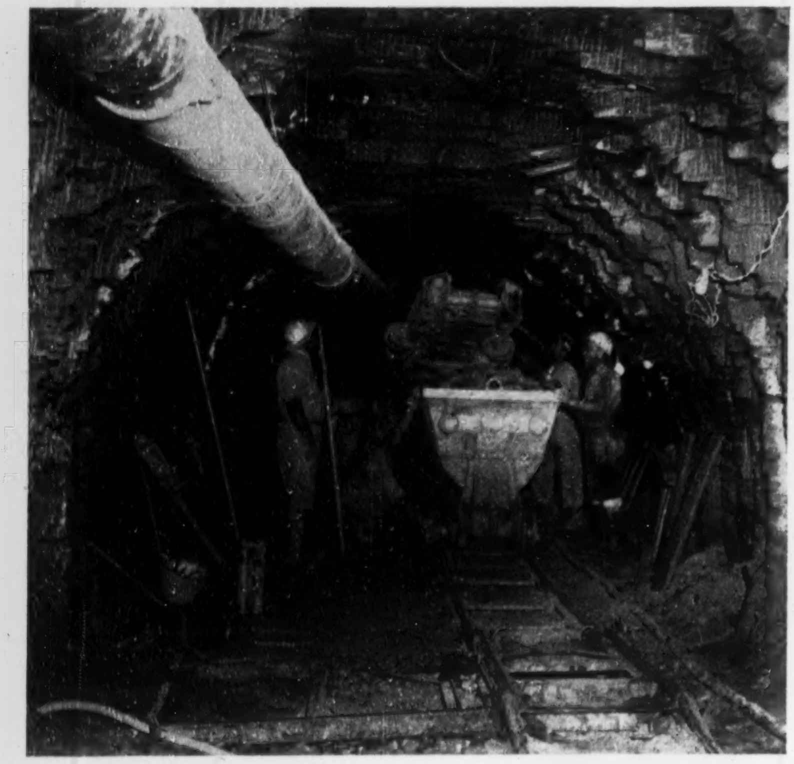


On large-volume paving, Koehring's big 34-E *twinbatch* hits top output of 86.7 batches an hour (60-sec. mixing time). This reserve capacity offsets normal job delays, assures an average of 50 batches hourly, 8 hours a day, at no increase in batching, hauling or finishing equipment.



"Timely", precision-finishing is important on any paving job. Koehring Longitudinal Finisher operates at almost twice the speed of a 34-E paver, produces mechanically-accurate concrete slabs, 8-to-30-ft. wide, uniform crown transitions.

YOU CAN'T DIG
A TUNNEL
WITHOUT IT



Ventilation is one of the ingredients you can't do without in underground construction. And when it comes to dependable push-pull ventilation, you can't beat lines of Naylor light-weight pipe. Naylor pipe is easy to handle—easy to install, particularly with Naylor Wedge-Lock couplings, the quickest possible connections. Naylor pipe is also made for "high air" and water lines.

Write for Bulletin No. 507 on line pipe and Bulletin No. 514 on Wedge-Lock couplings for vent pipe service.

NAYLOR PIPE

Naylor Pipe Company • 1248 East 92nd Street, Chicago 19, Illinois
Eastern U.S. and Foreign Sales Office: 350 Madison Avenue, New York 17, New York

NEW PRODUCTS

Weight ball made in two pieces for added safety

A new type of overhaul ball has been developed for use on long-boom cranes. The ball consists of two units: an iron sphere cast with a vertical slot through the center and an enlarged opening at the bottom; a cast steel wedge socket fits into this bottom opening.

When assembled, the hoisting wire passes directly through the center of the sphere and is locked in place by the open wedge socket fitted in the seat at the bottom. The hoisting wire is passed back through the slot and ends a few inches above the top of the ball. The socket is an independent unit and may be purchased as such if desired.

The Howe ball is said to offer the following advantages over other weight balls: the open clevis extending from the base is adaptable to any lifting attachment; compact design permits the ball to be used where head room is valuable; the open wedge socket bearing the load uses the maximum strength of the hoisting rope; and the spherical top surface eliminates sheave breakage on high lifts.

The ball is available in 12 weights from 25 to 400 lb designed to fit standard wire sizes from ⅜ to 1 in. ATLAS RIGGING AND SUPPLY CO., 462 FOREST ST., KEARNY, N. J.

New truck hoist is light in weight, inexpensive

Heil's Model 2426 is a lightweight, low cost, twin-cylinder hoist that is designed specifically for 8 to 17-ft-long platform bodies and for 8 to 10-ft dump bodies.

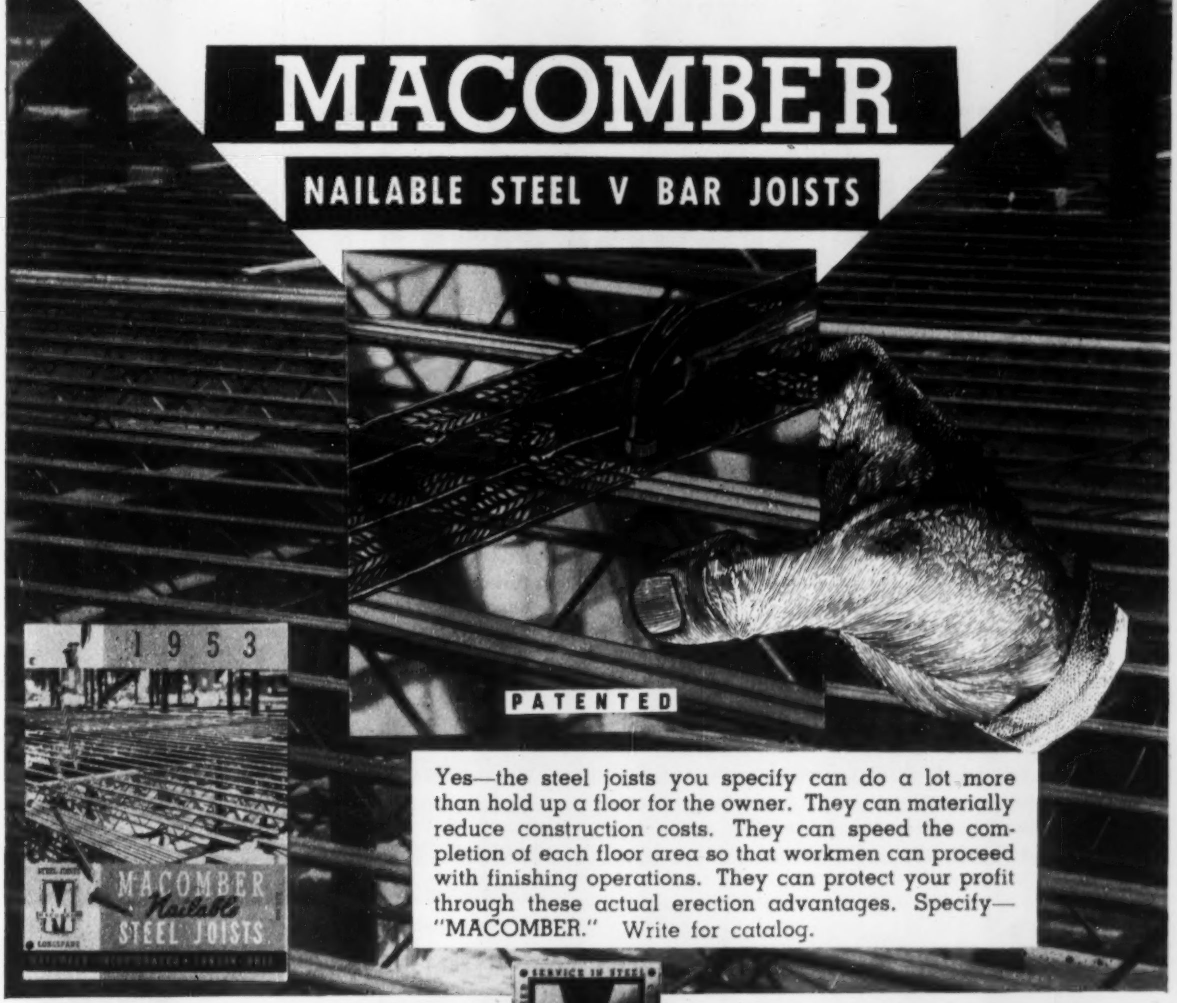
Operating features reported for the new moist include a 50-deg angle for the dumping of even sticky materials and a low mounting height—less than 10 in. between chassis and body bottom.

The hoist can be used with practically any platform body—even a ¾ or 1-ton pick-up if the frame has no "kick up" and the outside width is 36 in. or less. It is said to be installed by any competent mechanic in a few hours.

Payload capacity of the new hoist when used with a platform body ranges from 3¼ tons with a body length of 17 ft to 6¼ tons with a body length of 9 ft. When mounted with a dump body the payload capacity is rated from 5½ tons to 4¼ tons using 8 to 10-ft body lengths. THE HEIL CO., 300 W. MONTANA ST., MILWAUKEE 1, WIS.

Let's Look at the One Spot Where You CAN Save Money This Year

For that next commercial or institutional job—let's look into cost per square foot with Macomber Nailable Steel Joists. They arrive on the job ready to use—requiring no nailing strips to be added. They provide the speed of nailing in comparison to the tedious job of wiring top lath. Nailing through the rib anchors metal lath so it cannot slip into deep pockets of wasted concrete between joists. Add up all these savings in time, labor and materials and your choice will be—



MACOMBER

NAILABLE STEEL V BAR JOISTS

PATENTED

Yes—the steel joists you specify can do a lot more than hold up a floor for the owner. They can materially reduce construction costs. They can speed the completion of each floor area so that workmen can proceed with finishing operations. They can protect your profit through these actual erection advantages. Specify—"MACOMBER." Write for catalog.

ORIGINATORS OF THE OPEN WEB STEEL JOIST

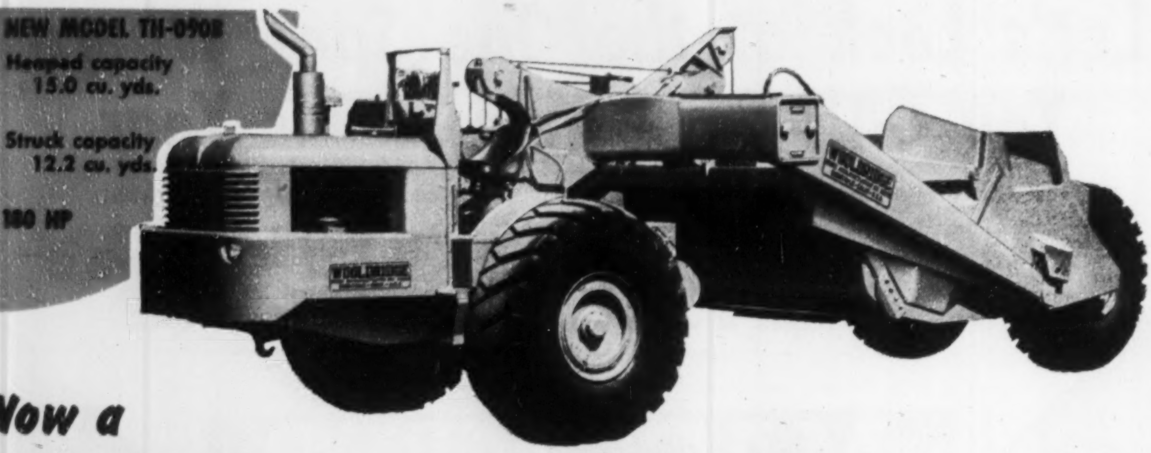
STANDARDIZED STEEL BUILDING PRODUCTS

V BAR JOISTS • LONGSPANS • STEEL TRUSSES • STEEL DECK

MACOMBER INCORPORATED

CANTON 1, OHIO

• ENGINEERING • FABRICATING AND ERECTING •



NEW MODEL TH-090B
Heaped capacity
15.0 cu. yds.

Struck capacity
12.2 cu. yds.

180 HP

Now a
WOOLDRIDGE *open bowl TERRA COBRA*
FOR EVERY CAPACITY RANGE

MODEL TH-0142
CAPACITY
18.0 cu. yds. 225 HP

NEW MODEL TH-090B
CAPACITY
15.0 cu. yds. 180 HP

NEW MODEL TH-090
CAPACITY
13.5 cu. yds. 165 HP

TWO NEW MODELS—job tested and proved—with the same superior features which have brought world-wide acceptance to the 18-yard Terra Cobras

Employing the same basic design features which have proved their ability in the 18-yard models, Wooldridge now offers two more *open bowl* Terra Cobras to meet capacity requirements of every job. Both incorporate latest engineering features including positive hydraulic steering, air-operated finger-touch controls, fast and easy boiling bowl loading, positive roll-out ejector, and the same ruggedness and simplicity which have earned Terra Cobras a reputation for higher production, minimum down-time and easiest servicing. Each is equipped with a dependable Cummins Diesel engine of ample horsepower for maximum efficiency to meet load requirements. Short turning radius, extremely high ground clearance, maximum flotation and traction insure greater profits. For lowest cost earthmoving on every job, get full information from your Wooldridge Representative, or write direct to Export Division, Wooldridge Manufacturing Company, Sunnyvale, California, U. S. A.

WOOLDRIDGE
WOOLDRIDGE MANUFACTURING COMPANY

Sunnyvale, California, U. S. A.

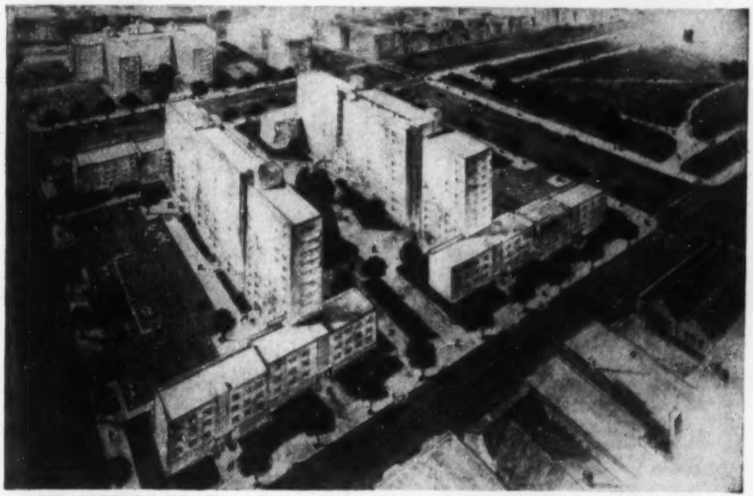
NEW MODEL TH-090
Heaped capacity
13.5 cu. yds.

Struck capacity
10.2 cu. yds.

165 HP

Terra Cobra
Terra Cobra Wagon
Scrapers
Rippers
Cable Control Units
Bulldozers

SORDID RELICS—harborages for rats, disease and delinquency, disappearing from San Francisco scene will be replaced by . . .



. . . FRANCISCO PLAZA, which will lift 608 low-income families out of slum living.

Wrecking crews wind up big slum job

Slum clearance program progresses despite hurdles as 119 parcels are acquired and 433 families moved

What is said to be the biggest slum clearance program in the history of the West is moving rapidly toward completion in San Francisco's Western Addition, where 124 decrepit buildings are being razed to make way for a new public housing project.

When the rubble is cleared, the San Francisco Housing Authority will start construction of a permanent housing development to be called Francisco Plaza, which will provide comfortable living quarters for 608 low-income families.

Construction will start this month after wrecking crews have finished tearing down the old gingerbread structures. Many of the once-elegant mansions predated and survived the 1906 earthquake and fire, but had deteriorated into over crowded rat-infested slums. Built in long solid rows, the frame buildings—many of them redwood fastened with square nails—had become a fire hazard as well as a threat to the health and morale of their occupants.

• Complications—To make room for the project, 119 separate parcels of land had to be acquired and 433 families moved out of the old buildings. In less than 12 months the authority obtained the land and structures, completed all the legal work and relocated the families. All the land was acquired without once resorting to condemnation, and at a price only 0.3% over appraisal. Only one person had to be evicted from the old premises.

In two years Francisco Plaza will be completed and ready for its new occupants, who will be charged rents ranging from $25 a month for one-bedroom units to $60 for four-bedroom units.

Families displaced by sale of the land will have first priority on the new apartments, if they qualify on the basis of income. About half the people dispossessed are Negroes; the rest represent a variety of 19 nationalities. The area was heavily populated with Japanese prior to World War II.

• Position challenged—The authority rents apartments in all its public housing projects according to a "neighborhood pattern," aimed at achieving harmony in respect to nationality and background.

(Continued on page 174)

Moderate cost . . . light on labor little maintenance . . . BUT

Tons of Performance

DRAG SCRAPERS

Crescent Scraper of 5-cu. yd. capacity—rigged for gravity return—shown returning to excavation point in the pit. Ask for Catalog A and Field Report 214.

SAUERMAN EQUIPMENT

Check **digging power** . . . **rate of haul** . . . **clean dumping.** Add **labor economy** . . . **low upkeep** . . . **personnel safety** . . . **moderate power consumption.** Total up the score . . . you'll **choose** one of these Sauerman Machines for your operation.

DRAG SCRAPER: *best* for pit or hill excavaton, reclamation or general handling of materials, wet or dry. Serves as rapid, long range conveyor. Sizes 1/3 to 15 cu. yds.

SLACKLINE CABLEWAY: *best* for deep digging — especially underwater — and conveying to a high delivery point. Reaches down a hundred feet or more . . . spans up to 1000 ft. . . . sizes 1/3 to 3½ cu. yds.

TAUTLINE CABLEWAY: *best* for long range aerial work. Lifts, conveys, places loads of unwieldly material. Ideal for dam construction or for conveying loads over streams and canyons.

CRESCENT SCRAPER ON BOOM MACHINE: *best* for increasing the work capacity of any boom machine on backfilling and grading jobs. When scraper is used with track cable and trolley, machine range is greatly extended.

Call on Sauerman's *experienced* engineers for the size and type system *best* suited to your digging, hauling or materials handling requirements. Write for catalogs . . . ask for idea-packed Sauerman News.

Slackline cableway performs difficult excavation of non-caving material from deep pit. 70% rock and 30% colloidal sand posed tough digging job. Ask for Catalog C and Field Report 216.

TAUTLINE CABLEWAYS

Tautline Cableway spans 920 ft. to carry 4-cu. yd. bucket of concrete from mixing point to dam site.

Crescent on boom machine dumps large load of wet peat. Bucket is gravity-returned on track cable to digging point. Ask for Catalog J-1 and Field Report 219.

ONE MAN MATERIALS HANDLING

SAUERMAN BROS., INC.

532 S. Clinton St., Chicago 7, Ill.

This position has been challenged in a case involving refusal to admit a Negro to the North Beach project, located in a neighborhood that consists largely of families of Italian descent. Insofar as it concerns segregation, the authority's policy already has been declared unconstitutional by the California Supreme Court. Appeal has been made to the U. S. Supreme Court, but it is not yet known whether the case will be heard.

Francisco Plaza will be built at two sites, both bounded on the south by the same street. In the western sector, three eleven-story buildings with three-story wings will be constructed, containing 432 apartments. Two eleven-story apartment buildings and a six-story structure in the eastern sector will complete the project.

In the five tower buildings, containing one and two-bedroom apartments, the center web will be served by elevators. These apartments are designed for small families and older people. The three-story wings will be walk-ups containing three- and four-bedroom units for larger families.

• **Offered to tenants**—All buildings will be reinforced concrete and steel, with bearing wall construction. Exteriors as well as interior ceilings and corridor walls will be exposed concrete. Buildings will be on spread footings, with no pilings required.

Each apartment will be equipped with electric refrigerator and stove. Automatic washers and driers, installed by concession, will be located on roofs of the high buildings. Aluminum casement-type windows that can be washed from the inside will be used.

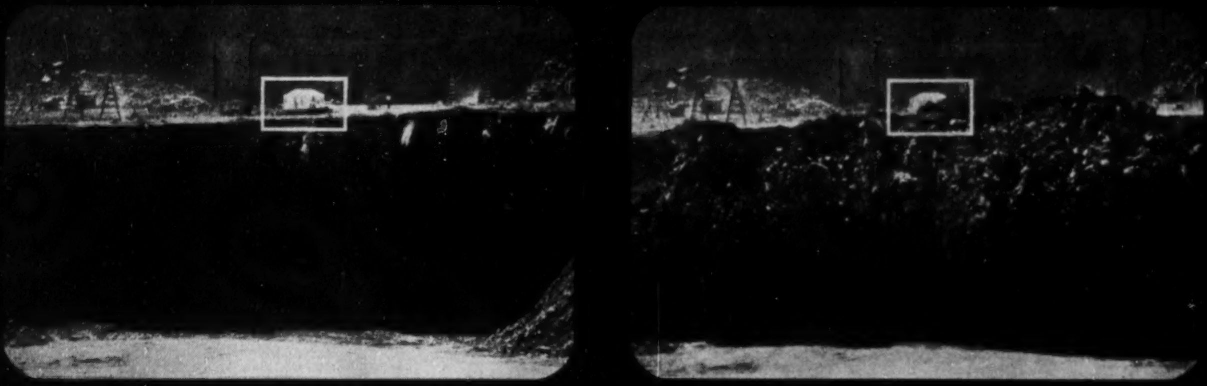
Buildings will cover 24% of the land. The rest will be devoted to play areas, landscaping and on-site surface parking. The project was designed without garages, but with large parking bays on the street side of the tower buildings. Central courtyards, with trees and shrubbery, will lie between the buildings.

• **Authority inventory**—The authority now operates nine projects, has two under construction and two more on the drawing boards. It is now providing low-cost housing to 3,412 San Francisco families, whose average stay in public housing units is 3½ years.

Within a year it will have completed construction of the 172-unit Portrero Terrace Annex and the 164-unit Alemany projects. Two other projects are at the bidding stage and the authority expects Congress to allocate money for them. Both of them,

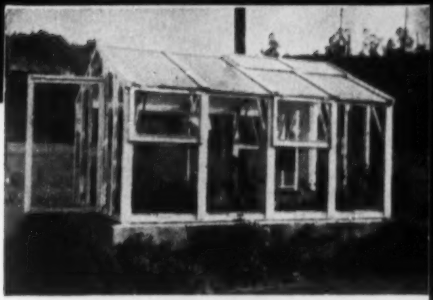
(Continued on page 176)

"Less shake...



Less noise...

No broken glass..."



WITH the help of the ROCKMASTER® blasting system and a greenhouse, the North Jersey Quarry Co., Millington, N. J., has built good community relations. They proved to nearby neighbors that their blasting produces less vibration in a dwelling than that of a slammed door.

The greenhouse is only 48 feet from the quarry face. Yet after the blast there wasn't a single crack in a pane of glass . . . the concrete foundation was in perfect condition. That is convincing evidence for any neighbor worried about his home.

By initiating the blast at the bottom of the holes . . . the point of maximum confinement . . . the ROCKMASTER blasting system keeps the explosive force confined where it does all its work on the rock. There is minimum air blast, no wild flying rock, no wasted explosives power . . . a well broken, easy-to-dig pile is the final result.

For quarrying, mining and construction work, see how ROCKMASTER can increase your blasting efficiency and improve your public relations. Ask your Atlas representative for a copy of the new Atlas Explosives Catalog that is just off the press.

BLAST DATA:

Number of holes	9
Average depth	56′
Spacing	17′
Burden	6 to 20′
ROCKMASTER delays	0 through 8
Average stemming	17′
Diameter of holes	6″
Total powder	3025 lb. (Apex #4 HV and #2 MV)
Rock produced	14,000 Tons
Powder factor	4.63
Loading started	8:30 AM
Loading finished	10:30 AM
Blast fired	11:15 AM

ATLAS

ATLAS EXPLOSIVES

"Everything for Blasting"

ATLAS POWDER COMPANY,
WILMINGTON 99, DELAWARE

Offices in principal cities

CROWD! HOIST! SWING!

Crowd, hoist, swing—*crowd,* hoist, swing—millions of times a day on jobs in construction, mining, and materials handling, rugged shovels slam the horsepower of powerful engines through hard-working clutches. Jobs like this call for tough, precision clutches, built to withstand loads *beyond* rated capacities. That's why more shovel builders and buyers *standardize* on Twin Disc "E" and "EH" Heavy Duty Clutches—with wider, better-finished surfaces; heavier, more compact construction.

Whether you're building shovels or other equipment . . . or using them . . . you'll profit by specifying Twin Disc Friction or Hydraulic Drives . . . developed from 35 years of specialized experience, backed by 8 Twin Disc Factory Branches and 60 Twin Disc Parts Stations.

Lima-Hamilton Division, of Baldwin-Lima-Hamilton Corp., incorporates Twin Disc Clutches in many products, including Heavy Duty Model "E" Clutches in its Paymaster Shovels. Write for Bulletin 108-F.

TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES
REG. U.S. PAT. OFF.

TWIN DISC

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin • HYDRAULIC DIVISION, Rockford, Illinois

BRANCHES: CLEVELAND • DALLAS • DETROIT • LOS ANGELES • NEWARK • NEW ORLEANS • SEATTLE • TULSA

Harbor Slope and Double Rock, were eliminated last August in a government order limiting the number of projects to be built during the current fiscal year, but the authority succeeded in getting a go-ahead after a three-month battle.

Harbor Slope, costing $2.2 million, will have 226 units; the $3.5-million Double Rock project will provide 350 units. Construction of both is expected to start this summer.

In addition, the authority is operating 3,600 units of temporary wartime housing that John W. Beard, executive director of the authority, believes can be "deprogrammed" at the rate of 1,000 a year.

Occupancy in these units is nonsegregated. By the spring of 1957, most of the land will be back on the city tax rolls.

• **Redevelopment agency**—The authority makes, a voluntary payment to the city in lieu of taxes and already has paid $2.9 million. The "in lieu" payment to be made for Francisco Plaza project will exceed the amount the city previously received in taxes from the replaced slum dwellings.

Important as it is in itself, the housing authority's Francisco Plaza also is a vital cog in furthering the plans of the Redevelopment Agency, the city's other slum clearance body (ENR July 19, 1952, p 46).

Francisco Plaza is adjacent to the Western Addition area where the agency wants to clear some of the city's worst slums. Families forced to move to make way for the city's cleanup program will be given second preference for the Francisco Plaza—if they have been displaced by the time the apartments are ready to rent. So the immediate future of these people hinges on the agency being able to get its Western Addition project under way.

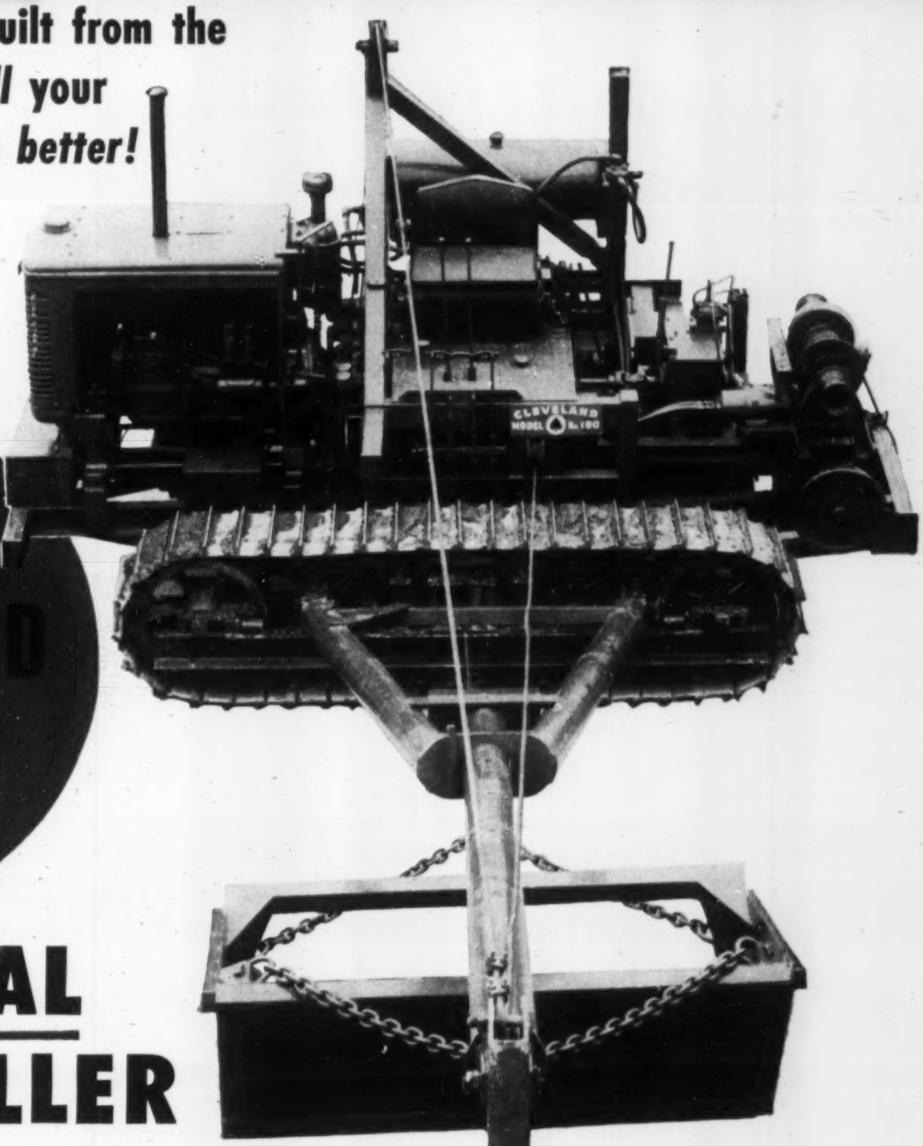
• **Test case decision**—The Redevelopment Agency got a green light to push ahead with its ambitious program, when the California District Court of Appeals recently established its right of authority under eminent domain.

To test the California Redevelopment Act, the agency petitioned for a writ to compel its chairman to sign contracts for federal loans and grants for two of its projects, Western Addition and Diamond Heights. These contracts with the government call for $21 million in loans and $6.5 million in grants.

As soon as the agency gets final approval of its plans from the San Francisco Board of Supervisors, and the

(*Continued on page* 178)

HERE IT IS... **built from the ground up to do *all* your pipeline backfilling *better!***



the CLEVELAND 190

A REAL BACKFILLER

Fast on the Flat
Sure in the Swamp
Steady in the Hills
Smooth on the Clean-up

- One Man Operated
- Perfect Balance, Side to Side, End to End
- 48 Crawler Speeds — from 1 Ft/M to 4.3 MPH
- Tow Winch Hydraulically Controlled
- 7-Ft. Backfill Board
- 4 Backfill Line Speeds
- Big Hydraulic Backfill Clutches
- Hydraulic Boom Hoist
- 79 HP, 467 cu. in. Diesel Engine

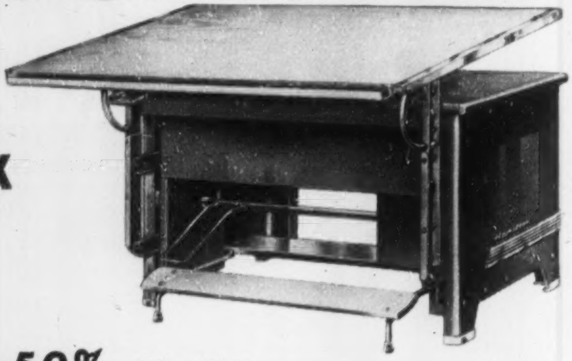
8′ Over-all Width (Less Boom) • Weight 22,500 lbs. • 18″ Pads
Ground Bearing Pressure 6.2 lbs. per sq. in.

GET THE FULL STORY ON THIS NEW CLEVELAND FROM YOUR LOCAL DISTRIBUTOR

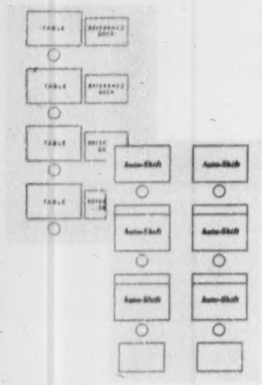
THE CLEVELAND TRENCHER CO.
Pioneer of the Modern Trencher
20100 ST. CLAIR AVENUE • CLEVELAND 17, OHIO

Auto-*Shift* TABLES

help get the work done

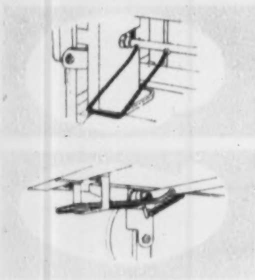


with 30-50% more space efficiency!



About 250 square feet accommodate *two more* Auto-*Shifts* than separate boards and desks. Auto-*Shift* puts a large reference surface and drawer directly behind each draftsman for greater space *and* operating efficiency—especially in row installations as shown below.

with much less draftsman fatigue



Auto-*Shift* provides fast, simple board adjustment—lets draftsman change working position often. Handy foot release (Fig. 1) frees top for height adjustment. Hand release (Fig. 2) permits easy slope adjustment. Fully counterbalanced top moves effortlessly.

See how Auto-*Shift* helps get the work done. Mail coupon below today!

DRAFTING EQUIPMENT DIVISION

Hamilton

MANUFACTURING COMPANY, TWO RIVERS 3, WISCONSIN

This Auto-*Shift* booklet is yours, *free*. Contains all the Auto-*Shift* facts, new ranges of sizes, data on new models for front and rear of row installations. Fill out and mail this coupon now!

HAMILTON MANUFACTURING COMPANY,
TWO RIVERS 3, WISCONSIN

Please rush me the Auto-*Shift* booklet (ADR-97).

Name ____________________
Firm ____________________
Address ____________________
City ____________ State ____________

MUNICIPAL

Federal Government, it will use its power of eminent domain to start a giant program of land purchasing, using federal money to buy and clear the land. The land then will be resold to private developers, according to agency director, James Lash.

There is a possibility that the decision will be appealed to the California Supreme Court either by the chairman of the Redevelopment Agency or by the intervenors in the case, a group of Diamond Heights Property owners.

- **Western Addition** – The agency wants to acquire 28 blocks of slum dwellings, relocate 8,000 people, and sell the land to builders who would construct new high-density apartments, walk-up apartments and flats. Plans call for changing the street pattern to provide parks and play areas.

- **Diamond Heights**–Land in Diamond Heights is mostly unusable now because of the steep streets. The agency plans to obtain 325 acres, lay out a new street pattern and develop the site for single and multiple unit residential housing. Calling Diamond Heights a blighted area has been questioned, according to J. Joseph Hayes, chairman of the agency. Although it is not a slum area, the agency contends that it is blighted because its topography renders it nearly useless to the city in its present condition.

- **South of Market**–The third major project is an area, now occupied by run-down apartments and flats, which the agency hopes to develop for light industry. If the courts clear up the question of eminent domain, the agency will condemn portions of this land as it receives firm offers from private industries. The agency will then sell it to the highest bidder at a public sale.

First concrete indication of interest in this area has come from the United Parcel Service, which would like to acquire an additional 1.73 acres adjacent to its present location to expand its facilities. The agency hopes to persuade other private interests to come forward with plans for replacing the remainder of that block's slum housing with new business or commercial structures.

Architects for Francisco Plaza are Ambrose & Spencer; General contractors, Theo. G. Meyer & Sons; structural engineers, Hall, Pregnoff & Matheu; mechanical engineers, G. M. Simonson; and site engineers, Dames & Moore, all of San Francisco.

(*Municipal continued on page* 181)

Whatever You Build ... Build it Better with VIBRAPAC Block

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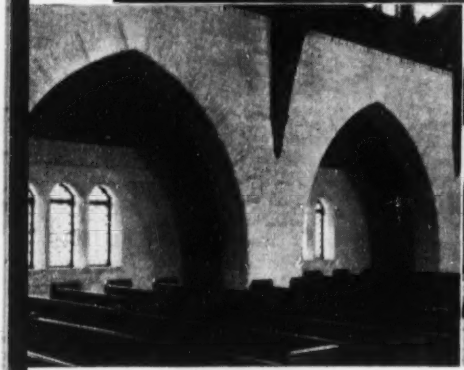
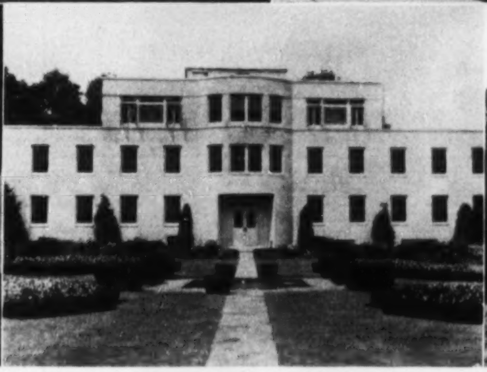
ELEMENTARY SCHOOL





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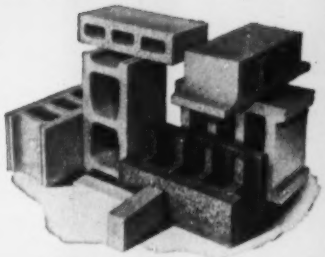

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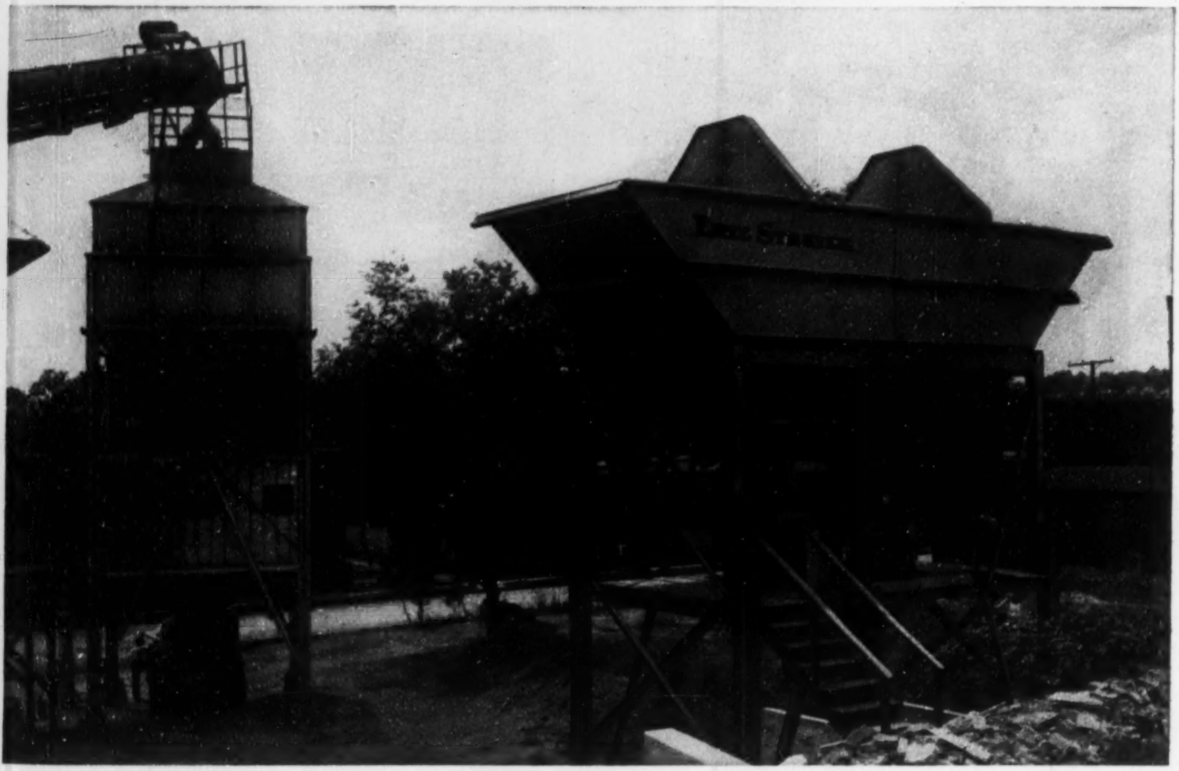

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"We ordered our first Erie Bin," says president Dodson H. Felton, "back in 1948." It gave us very good service. Since then we've added 3 more, giving us, all told, 4 Erie Bins. We're pleased with their performance.

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Cities decentralizing? Maybe not

The widely-accepted statement that U. S. cities are decentralizing rapidly may not be an undisputed fact, it began to appear this week.

And if it isn't, a lot of municipal planning, and a lot of business thinking—both of which heavily affect construction—may need to be revamped.

The first crack in the apparently solid front of acceptance of the decentralization idea appeared when the Real Estate Board of New York (City) Inc. reported that its study of apartment occupancy statistics showed even greater occupany in 1953 than in 1952. The board's survey report went on to a conclusion that the biggest U. S. city is, in fact, gaining population rather than losing it.

To see if any nation-wide trend was in evidence ENGINEERING NEWS-RECORD correspondents in 11 major population centers (including New York, Chicago, Denver, Philadelphia, and San Francisco) set out to make a quick check.

Here's what their reports add up to:

• **Conclusions**—There is certainly no recognizable pattern of heavy exodus from the big cities. If not gaining in population, almost all are holding their own—although the cities certainly are not gaining at the rate that appears to have been general before World War II.

A concensus of the best available sources of information on the subject of population shifts (utility companies, real estate groups, city and county officials) lends strength to an assumption that much of the population drawn to suburban areas—which indisputably are growing fast—around great cities came either from newly-formed families or from persons hailing from far-distant areas, attracted to the cities as places of employment, but unwilling to live in the city itself.

Both cities and suburbs are thus growing because of increased birth rates and family formation of the years immediately following War II. And the cities are gaining further from two other natural factors: Increasing longevity of population—and the "move back" to greater convenience for older couples, whose families have grown up and left suburban homes.

Many of those contacted by ENR's reporters, incidentally, credited city efforts to clear slums and provide better facilities for housing and transportation with at least some of the holding power of the cities.

• **Some still gain**—Of the cities checked, three in particular reported continuing population gains: New York, Philadelphia, Denver.

In New York, said the Real Estate Board, a check of 1,573 competitive apartment buildings showed 308 apartments available at the time of the survey this year, as compared with 414 units a year ago. (The survey included both elevatored and walk-up buildings.) More, said Board President Clinton W. Blume, all apartments

(Continued on page 184)

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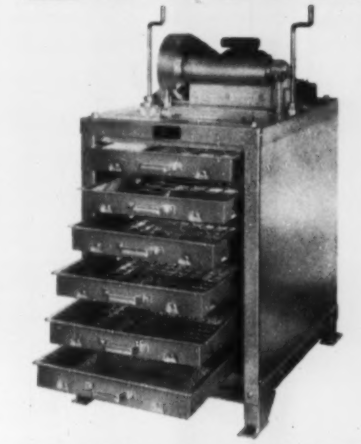

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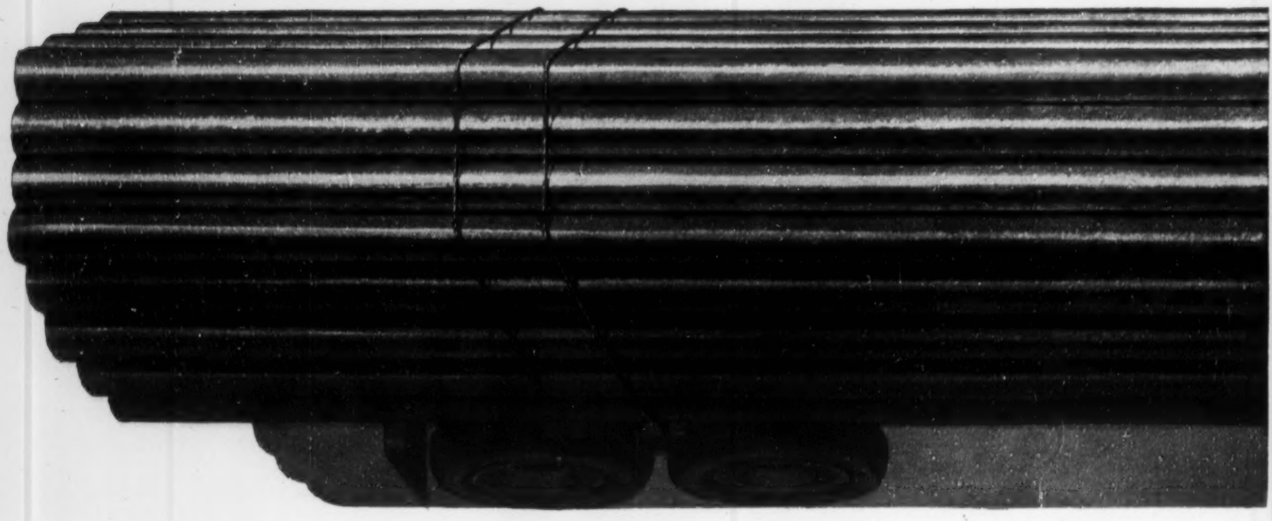

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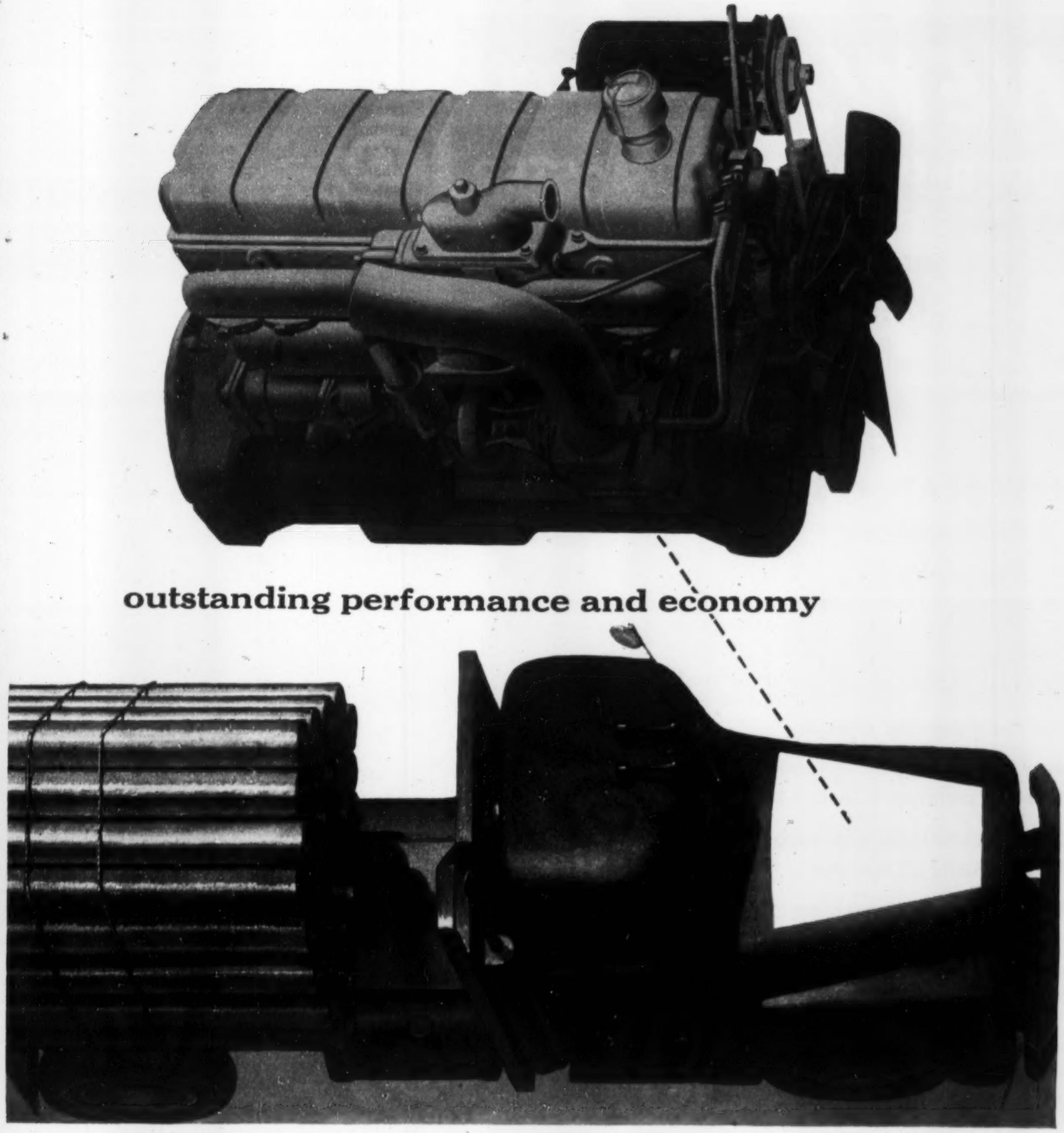

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vacated were re-occupied almost immediately, and, since new tenants usually pay more for the same accommodations than the old, it seems apparent that the "replacement population" is at least of the same income level or perhaps higher.

Denver—which figured a population gain of more than 40,000 in three years—wasn't much surprised by the influx and continued growth. "There's always a trend from the rural areas to the cities in Colorado in good times," commented Phil E. Berg, executive vice-president of the Board of Realtors. Surveys by this board and others indicate that the supply of permanent-type private dwellings in the area has been increasing steadily, as has temporary and non-private accommodations. (A number of cities in New Mexico reported also that the urban attractions they offer were continuing to draw population from rural areas.)

And Philadelphians were very sure that their city was gaining. One of these is Mrs. Dorothy Schoell Montgomery, executive director of the Philadelphia Housing Association—who herself recently moved back to the city from suburban Huntingdon Valley. Mrs. Montgomery said that when the city gets well into its present program of public housing and re-development, a greater influx will result. Samuel Gorson, counsel for the Apartment Owners and Managers Association, reports that the city's 100,000 apartment units are now 97% filled—the empty ones being those not in top-flight condition.

• **Some stay even**—Chicago apparently has no pronounced trend either in or out—but some observers think they can spot a move back toward the city, as housing facilities improve, and transportation problems are ironed out within the metropolis. Another favorable point for Chicagoans is the increase in off-street parking facilities—as they go up, so will population.

San Francisco—its expansion hampered by geography—is also either holding its own or gaining slightly, reports indicate. The California Tax Association figures there has been some drop in the city's 1950 population of 775,357; the Chamber of Commerce—backed by figures showing increases in telephone and utility connections—figures the population has moved up to 801,000.

• **Some don't know**—Los Angeles and Seattle, with large open hinterlands easily available, both report continuing movements outwards—although Los

(Continued on page 187)

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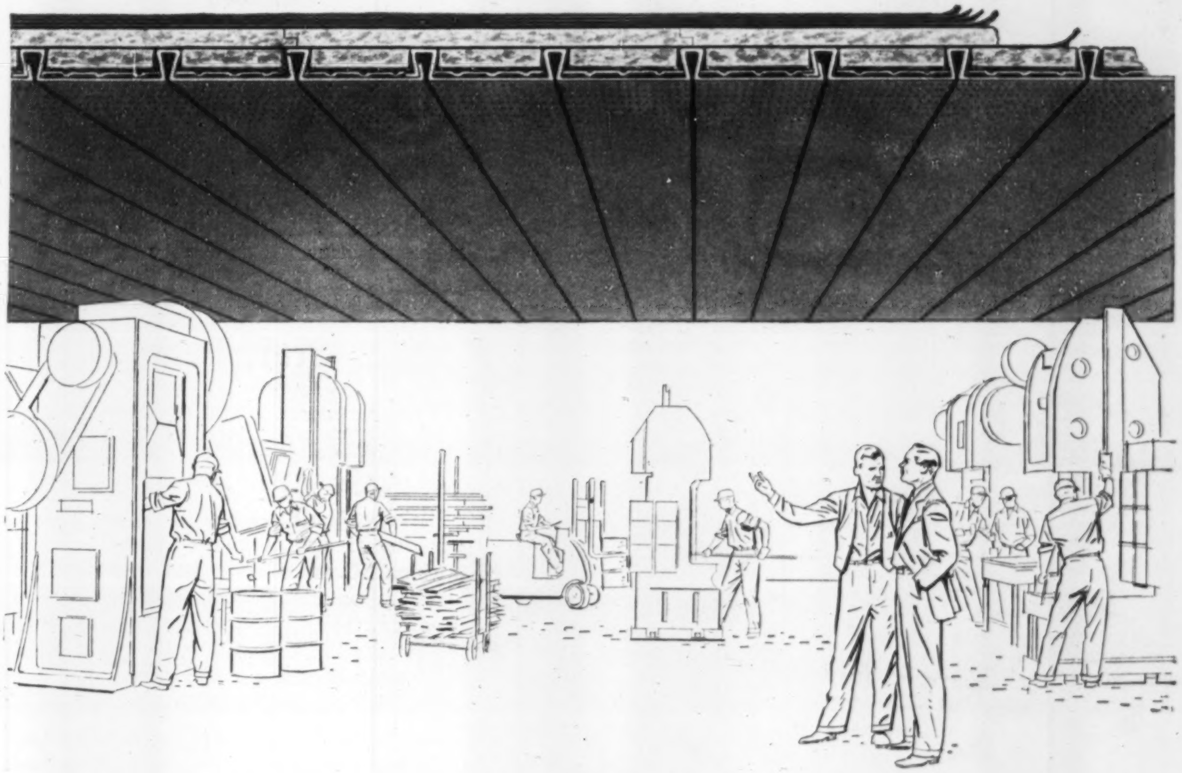

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Noise, Noise, NOISE. Nagging, hammering, screeching, deafening. In plant after plant, workers complain, work lags, men stay home until their heads stop ringing. Industrial noise causes a reported *$4,000,000*-a-day loss in worker efficiency.

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Holorib is lightweight. It saves you building time, labor, materials and money. It's practically maintenance free. But you *can* wash it or paint it time and time again without hurting its acoustical efficiency a bit. And, it's *noncombustible!*

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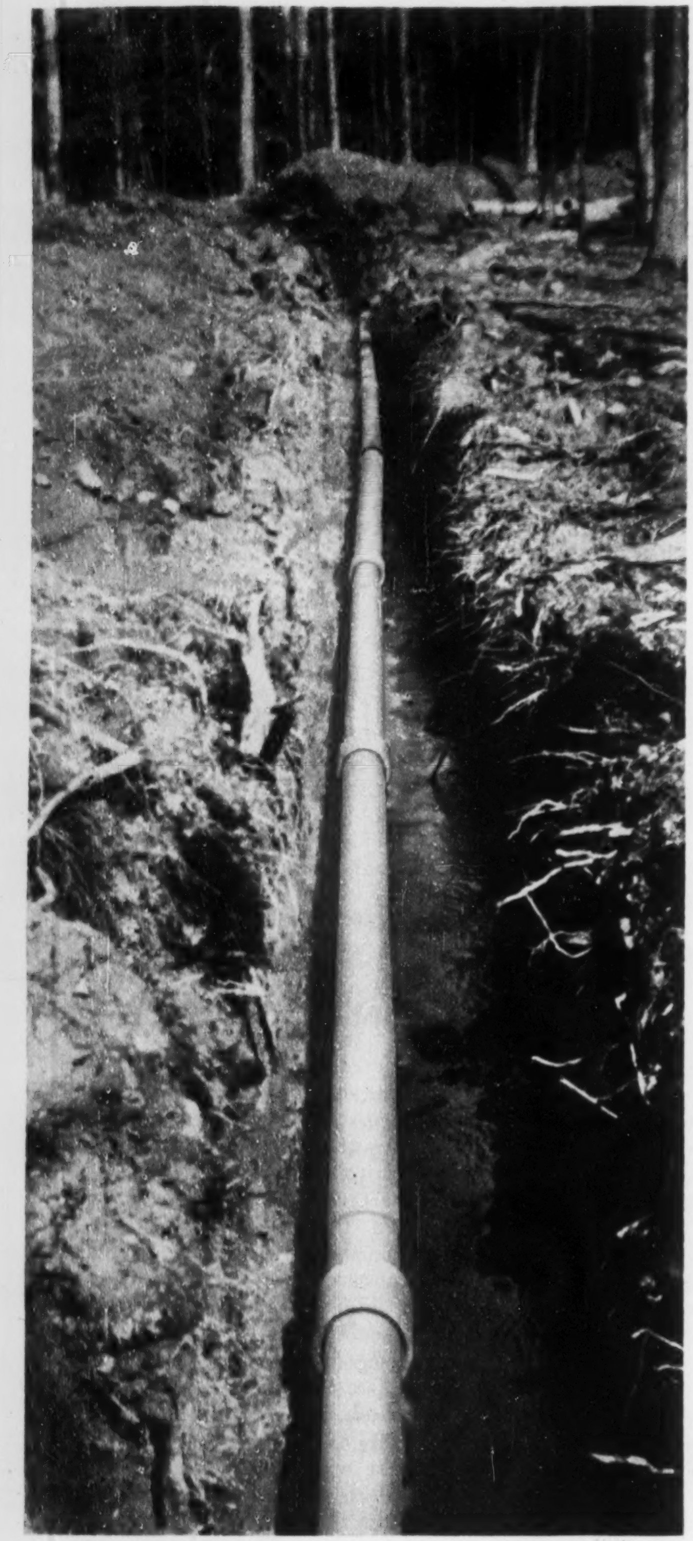

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Angeles actually reports an increase of its own population of 6.8% while the surrounding county was going up by 15.3%.

Detroit and Cleveland—where authorities said they saw definite trends outward, nevertheless both reported nearly full occupancy of existing facilities. In both cities, construction of new housing within the city has been lagging badly.

And even in Phoenix, Ariz., there was evidence of faith in the city's downtown business future. L. Korrick's Department Store announced a $1.7 million expansion program, which will include air conditioning, moving stairways and other customer conveniences.

California activates new bldg. standards commission

Steps have been taken in California to activate officially the 13-member State Building Standards Commission created at the 1953 session of the California legislature (ENR Aug. 13, 1953, p 26).

Gov. Goodwin J. Knight has named the three members who will represent local governments. They are Walter Zuetell of Pasadena, who has been associated with the Pasadena department of building for 28 years and superintendent since 1947; A. W. Russell of Redwood City, chief building inspector for San Mateo County for about 20 years and Dr. George Uhl, Los Angeles city health officer.

The governor's office announces that three representatives from the building industry will be appointed to the board shortly.

Other members are the state architect, state fire marshal and directors of public health, mental hygiene, social welfare, agriculture and industrial relations.

By March 9 the board is required, under the law to "promulgate and publish a State Building Standards Code that shall supersede all the existing regulations issued by the individual state departments."

"Thereafter," the law continues, "the commission may approve and publish amendments to the code not oftener than once each 90 days."

The intent of the statute is to eliminate duplication and overlapping in state building regulations.

State Architect Anson Boyd reports that groundwork on the code already has been laid by the staff in his office. When all members of the commission are selected, he pointed out, much of the preliminary work will be out of the way.

(Continued on page 188)

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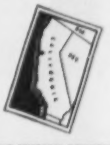

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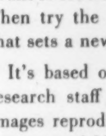

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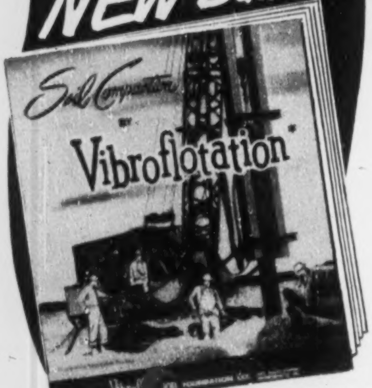

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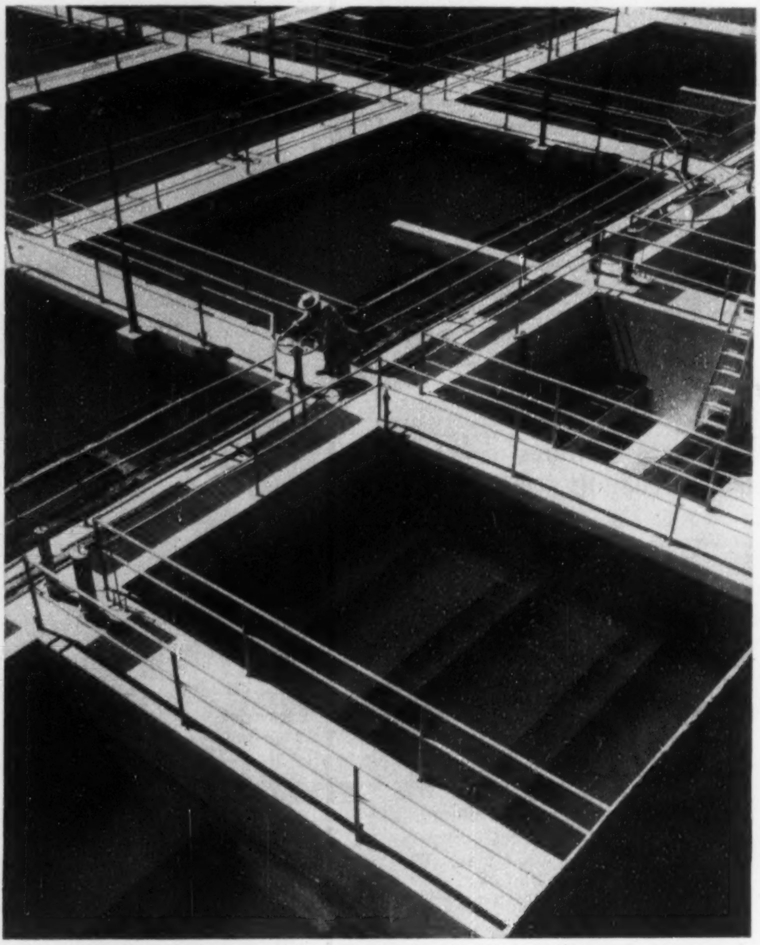

WATER TREATMENT PLANT will clarify and filter water from a Sacramento River tributary 31 miles away and from other local sources. Capacity is 21 mgd at a filter loading of three gal per sq ft per min. There are 12 filter beds and room for 8 more.

New ideas built into new waterworks

A waterworks now in service as part of a $6-million water supply construction program for Vallejo, Calif., has these distinguishing features:

- Hydraulic-jump flash mixing for the handling of two different waters at the same time from a single alum dispenser.
- Variable speed flocculators in series.
- Reclamation reservoir for reclaiming wash water and basin top water for retreatment.
- Sludge lagoons for reclaiming sludge for use in parks as topsoil.

In addition to the new treatment works, Vallejo has a new water source, replacing inadequate local sources and a temporary wartime connection with the East Bay Municipal Utility District.

Primary elements of the over-all project are a 14-mgd rapid sand filter plant, a 20-mgd main pumping plant, a 14-mg open reservoir with a 16-mgd pumping plant and 31 miles of 27, 30 and 31-in. concrete cylinder pipe. Nearing completion is a 25,000-ft long, 24-in. dia cross-town pipeline. And a 4½-mgd water treatment plant to serve Travis Air Force Base is well under way.

Work was necessitated by wartime growth of the community, located on tidal water some 40 miles from San Francisco. Wartime population stayed on to serve the Mare Island Naval Shipyard, Vallejo's primary industry. Result was that existing local sources were overtaxed.

Preliminary investigations included

(*Continued on page 190*)

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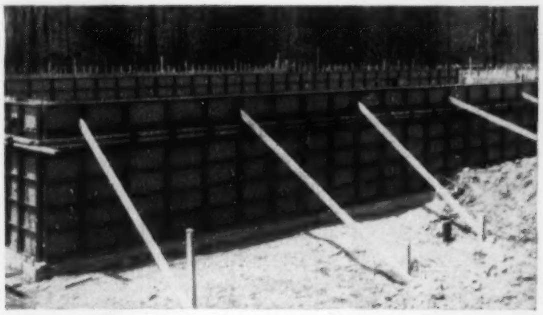

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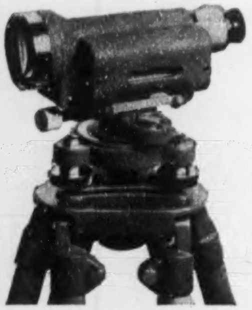

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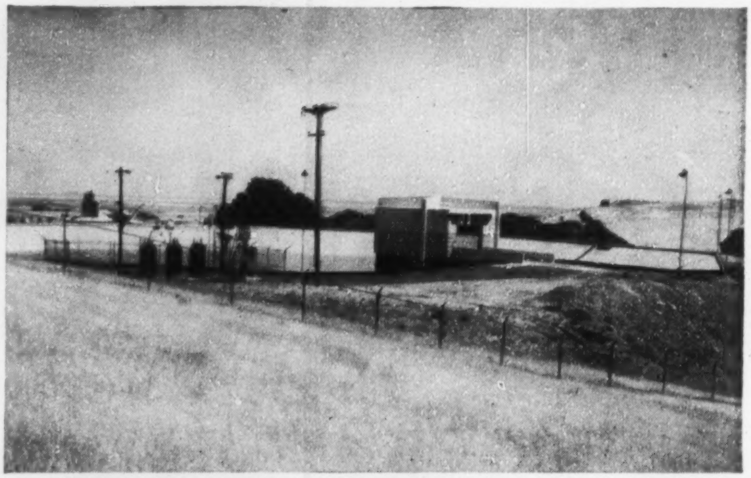

CONCRETE-LINED RESERVOIR six miles from treatment plant provides 15 mg storage. A 16-mgd pump plant moves the water from reservoir to filter plant.

CHECKING DETAILS at the water treatment plant are T. D. Kilkenny (left), city engineer of Vallejo, and H. L. Thackwell who directed design work for Kaiser Engineers.

consideration of water from the USBR's Monticello Dam on Putah Creek. But a source on a tributary of the Sacramento River 31 miles away could be developed more quickly and at less cost. The system is laid out so that it can accommodate water from Monticello Dam if, at some future date, an agreement is reached with the USBR for its use. (This might well become necessary sooner than anticipated if a district is formed to include such other nearby cities as Crockett, Benicia, Fairfield and Suisun. One stage of preliminary investigations envisioned such a district as also including Travis Air Force Base. The district idea was dropped when the other communities found it impossible to participate. But Travis Air Force Base, located along the pipeline, has contracted with Vallejo for water, and a filter plant is being built for this service connection.)

Designers of the new work for the city of Vallejo are Kaiser Engineers with George Havas as vice-president and chief engineer. Design was directed by H. L. Thackwell.

Contractors included Walsh Construction Co.; E. E. Lowell; Erickson, Phillips & Weisberg; Fred J. Early, Jr. Co.; and Coast Pipeline Construction & Winderlich Contractors.

T. D. Kilkenny is city engineer of Vallejo.

Ask bids on interchange for S. F. Bay bridge

A $5.6-million project to revise the traffic distribution structure at the east end of the San Francisco-Oakland Bay Bridge was advanced a step recently, when California Director of Public Works, Frank B. Durkee authorized advertising for bids.

An allocation was made for the project in the state highway budget after additional highway-user tax funds became available last year. It was the largest item in the 1953-54 budget.

The project calls for construction of three additional ramps designed to eliminate cross-weaving traffic movements. The change will double traffic capacity of the Oakland distribution structure. Work is expected to take about two years. During that time most of the existing structure will continue in use.

(*Municipal continued on page* 192)

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Regardless of your requirements—Schramm, Inc., can furnish a complete air compressor combination for your job... in various sizes and mountings with all necessary tools and accessories.

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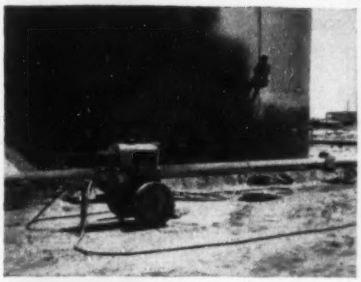
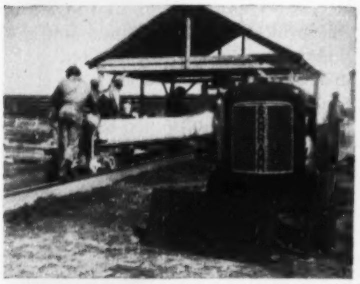


1. Model 20-c. f. m. operating paint spray for painting steel tank.

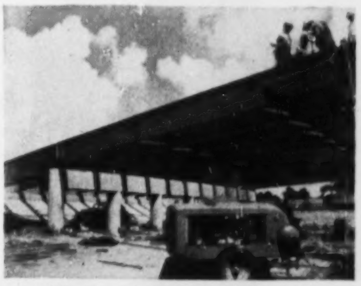
2. Model 35-c. f. m. operating demolition tool for removing concrete base.

3. Schramm Pneumatractor with Sky-Worker solves overhead problems.



4. Model 60-c. f. m. furnishing air for paint sprays coating 65 mile of 20" pipe.

5. 105-c. f. m. Pneumapower providing air for backfill tampers.



6. 105-c. f. m. Unistage operating riveting hammers on steel erection job.

7. 315-c. f. m. operating three heavy duty rock excavating tools preparing new foundation.

8. 600-c. f. m. diesel engine drive operating two WDR-126 Schramm Wagon Drills.

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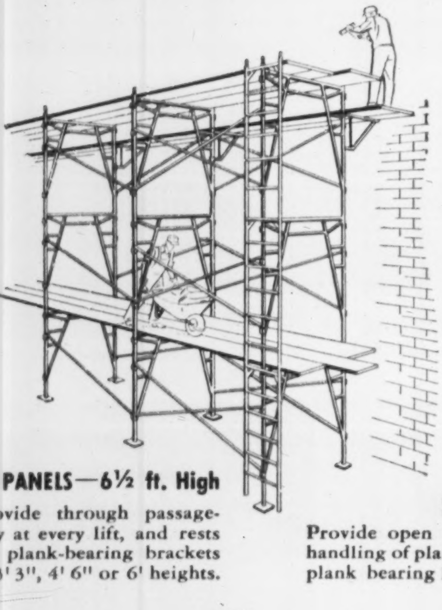

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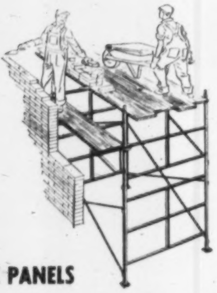

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MUNICIPAL

Slum project ok'd

Bitter housing battle featured in N. Y. hearings

A construction start on one of the most bitterly contested housing programs since the inauguration of financing under Title I is on the way after approval by New York City's Board of Estimate.

The nine-block-square, $29-million face-lifting of a blighted area near the Washington Square section in downtown Manhattan had all the characteristics of a routine application-approval sequence until last December, when the plan, submitted by the Mayor's Committee on Slum Clearance, received the approval of the New York City Planning Commission.

However, area residents and manufacturers exploded into immediate bitter opposition, condemning all proponents of the program—including the city's Mayor and Park Commissioner.

• **Arguments in favor**—The project, as presented, involved acquisition and clearing of 17.68 acres of blighted residential and commercial properties; closing two streets to form three large blocks in place of the original nine, and construction of nine 14-story terrace apartment buildings.

The existing platting of the area is limited to deep narrow lots with consequent restrictions on ventilation and access. Almost 100% of the land in the project area is occupied, and parking is almost entirely limited to the narrow, cluttered streets.

Light manufacturing constitutes 90.2% of the improved-land use; only 3.97% is residential. Of the commercial buildings 80.3% are said to be deteriorated or badly run-down, and 10 of the total of 16 residential buildings are in the same condition.

Of the existing buildings, 83% are more than 50 years old, many considerably older. The balance of the structures, in use since the late 1920's, are the New York University School of Commerce, three apartment houses and commercial buildings. None of the latter is adaptable to requirements of present-day business, according to the committee report.

The new project will contain 2,184 apartments with an estimated population of about 4,000 persons. Anticipated per room rent will be $45 a month. Most tenants will be in the middle income brackets.

The buildings will be of fireproof construction and the residential land

(*Continued on page 195*)

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coverage will be less than 24% of the net residential land area. Two retail areas will provide stores and possibly offices accessory to the residential development.

Store and office structures will not exceed two stories in height. Garage and off-street parking spaces equal to about 40% of the total number of apartments will be provided.

• **Arguments opposed**—Residential and commercial tenants in the area directed their wrath against New York University, Parks Commissioner Robert Moses, Mayor Robert Wagner and the members of the board for their approval of the plan.

The university, which will purchase three acres for expansion purposes, came under attack because—say opponents—the university will pay only $5.50 per sq ft for its portion while private builders will be charged $10.50. A spokesman asked why the institution should get a "cut-rate campus" at the expense of evicted residents.

The Citizens Union, a 56-yr-old unincorporated group of 3,500 members, threw its weight behind the opposition with a seven-point objection to the acceptance of the program. CU objections included:

• none of the suits planned would provide more than one bedroom, and would therefore provide housing for childless couples or unattached individuals only—not the class principally in need of housing assistance;

• subsidy money should not be used to provide housing at $45 to $48 per room a month.

Other points of opposition aired were the cutting of Fifth Ave through Washington Square, thus creating congestion to the detriment of the existing small park; too much area in the plan developed to parking facilities; displacement of hundreds of small businesses employing thousands of persons.

The report continues with, "We (the CU) particularly wish to emphasize our continued objection to this type of haphazard 'planning' without relationship to any overall plan for the area as a whole."

The committee, fortified by approval of the city's planning commission and the more recent favorable vote of the Board of Estimate, has announced that the work will be under way by April.

Meanwhile, the commercial tenants slated for eviction have indicated that they will continue their fight to stop the slum clearance project.

(Continued on page 196)

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—SAYS RAY W. STRAND
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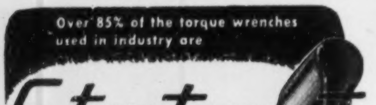
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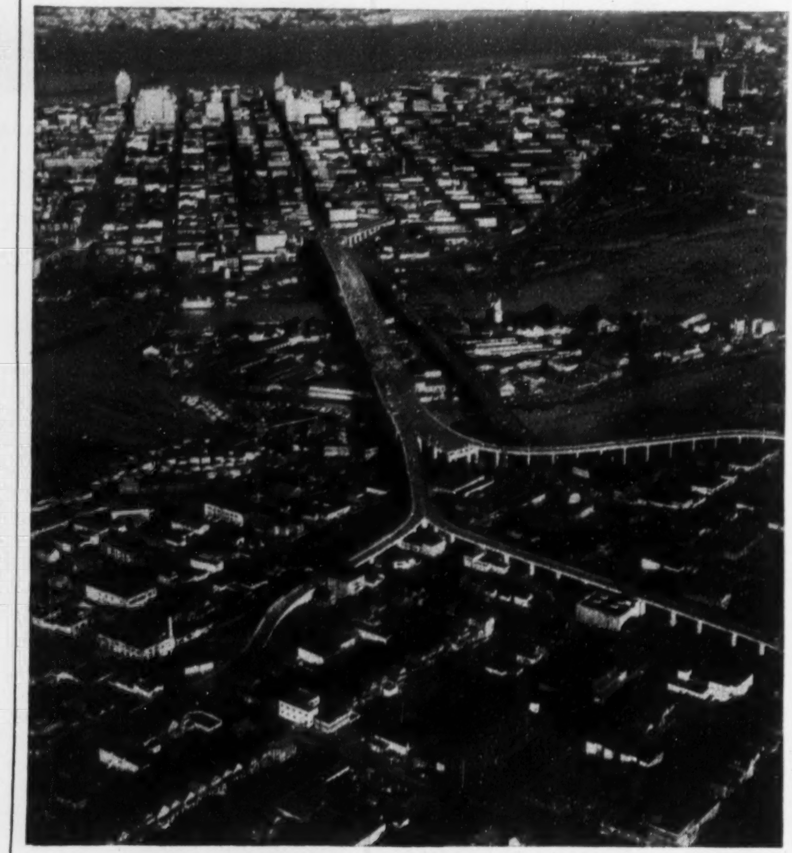


New 8-lane bridge for B.C.

Canada's first eight-lane bridge, the $16.5-million Granville Bridge in Vancouver, B. C., was opened for traffic officially at the end of January. Final completion is scheduled for June of this year.

The new cantilever structure replaces the old Granville Bridge, a steel-and-timber structure with swing span, erected in 1909 at a cost of $526,000. Total length, including approaches, is about three-fourths of a mile.

The bridge is in three sections, a center span over False Creek and Granville Island, and two approach spans.

The 1,772-ft central portion has steel deck-truss spans. Width is 102.5 ft, including sidewalk. Clearance at high water is 90 ft for a width of 210 ft. Clear distance between piers is 370 ft.

Cloverleaf approaches to the bridge are reinforced concrete of various widths to accommodate flow of traffic. Estimated bridge capacity is 4,000 vehicles hourly, plus trolley coach transit.

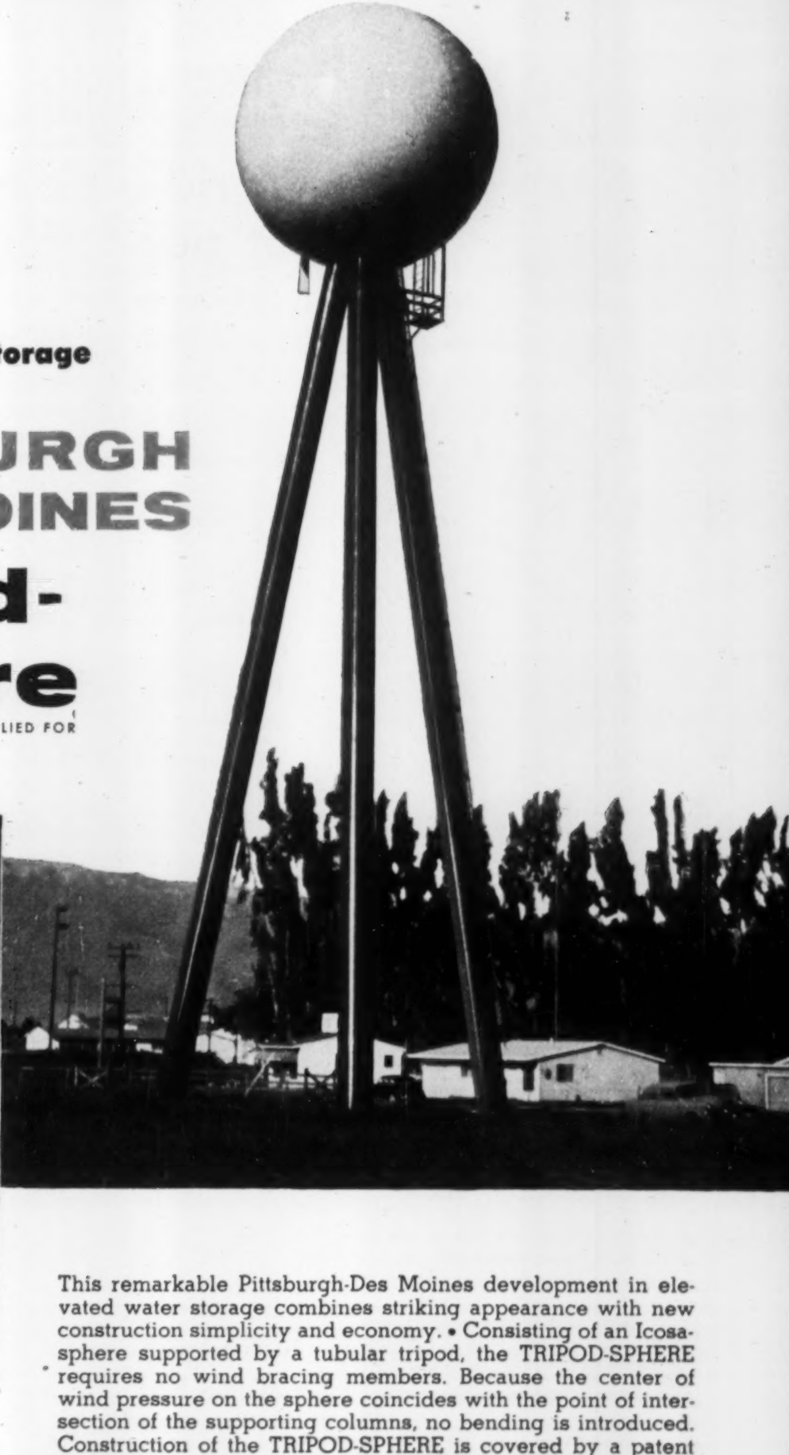
The main channel piers are supported by 703 ten-inch steel H-sections with an average 34-in. penetration.

Contract price for Section 1 was $6,254,376. Unit cost was approximately $34.50 per sq ft. Contract price for Sections 2 and 3 was $5,573,023.

With the exception of steel plate and some structural shapes from the United States and Britain, the bridge was constructed entirely of local British Columbia products. All reinforced steel was rolled locally and the bridge was designed, detailed and fabricated in the province.

Design loadings follow AASHO (1949) standard specifications for an H20-S-16-44 loading with appropriate allowances made for impact-wind temperature-shrinkage and torsional stresses.

Joint contractors are Dawson Wade and B. C. Bridge and Dredging Co. Ltd. Consulting engineer is J. R. Grant, in association with Pearson, Phillips and Barrett. Project engineer is C. E. Jukes. All are under the direction of John C. Oliver, Vancouver city engineer.



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PITTSBURGH •DES MOINES

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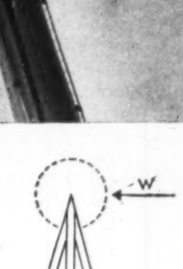
PATENT APPLIED FOR



The TRIPOD-SPHERE illustrated, located at Gonzales, California, has 100,000-gallon capacity, with 31 ft sphere, on a 100 ft tower. Head range is 23 ft 1 in. Diagram shows how wind force (W) on sphere places columns in tension or compression, without bending.

This remarkable Pittsburgh-Des Moines development in elevated water storage combines striking appearance with new construction simplicity and economy. • Consisting of an Icosasphere supported by a tubular tripod, the TRIPOD-SPHERE requires no wind bracing members. Because the center of wind pressure on the sphere coincides with the point of intersection of the supporting columns, no bending is introduced. Construction of the TRIPOD-SPHERE is covered by a patent application. • Write for details on this new design in terms of your prospective water storage needs.

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INTERNATIONAL

World's highway construction set peak activity in 1953

Various national plans indicate another record in '54— U. S. technical and financial aid policies seen as spur

Highway construction around the world continued at record breaking levels in 1953, and may increase to a higher volume in 1954, according to the International Road Federation. The key to optimism is the newly avowed U.S. policy that will concentrate more foreign aid funds on road building in areas requiring internal distribution. The policy is an outgrowth of economic gains in Turkey and Southern Italy that were sparked by highway work financed by relatively small loans.

At the close of World War II Turkey had a security grant of $100-million from the U. S. Starting practically from scratch in 1947, the country allocated $5 million for highway construction to link centers of population with all-weather roads. Today, five and a half years later, this goal has been reached, according to the U. S. Foreign Operations Administration.

New roads and roads salvaged from old caravan tracks total 13,000 miles. Total U. S. aid to date has been $35 million, $22 million of which has been spent on U. S. roadbuilding equipment. Turkey has spent $180 million in the program.

In the year ahead, IRF reports, the focus for U.S. aid will be the Near East and the Arab states, and special technical assistance for highway construction will be stressed for Korea, India, Pakistan, and Latin America. The following is a breakdown, country by country, in so far as information is available, of notable programs and construction work inaugurated in 1953:

• Middle East

• **Syria and Lebanon** are joined in a highway project—aided by the Rockefeller Foundation—that will link their principal Mediterranean seaports with the rich Arabian oil ports on the Persian Gulf. The program will cost about $100 million—$60 million of which is to be a loan from the foundation. Part of this loan would also cover work in Libya. A PanArabian Highway Authority will administer and operate the program.

This month a World Bank Mission has started an overall economic survey of Syria which will turn up that nation's need for new highways.

• **Saudi Arabia** will embark this year on an extensive program of road, railway, and port development. Two main areas for the highway work are the Jidda-Mecca-Taif area, on the Red Sea, and the oil centers of Dharan and Dammam on the Persian Gulf. U.S. technical aid is involved in the plan.

• **Jordan** has prepared a $13-million five-year plan for the development of a network of main roads to link all parts of the country. British financing is involved in the scheme and it is reported that West Germany has expressed readiness to take part.

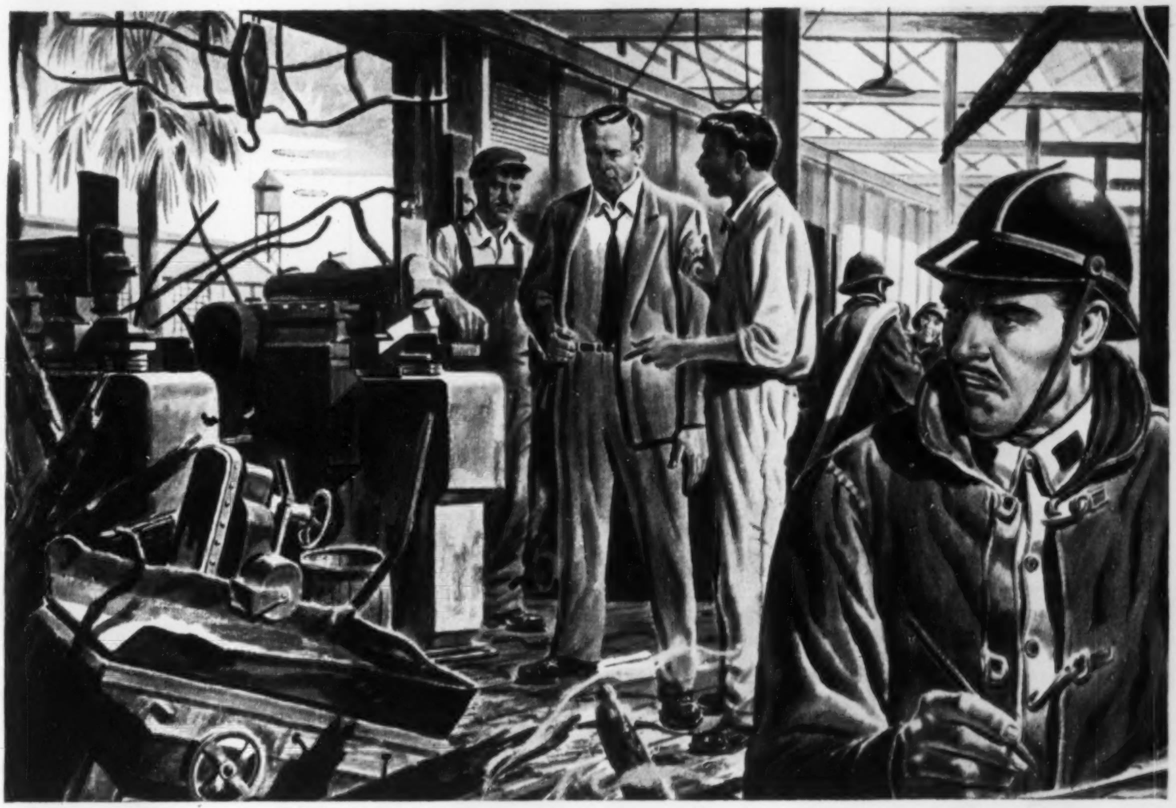
• **Iran** is receiving assistance from U.S. and United Nations technical missions for a road development program that will get its initial boost from special U. S. economic grants designed to alleviate Iran's current economic depression. When the country's oil-based economy is back on its feet, development of the country should take big strides.

• **Iraq**, in an overall national economic development program financed by its oil revenues, will spend $78 million in the next five years on highway construction. Bids have been asked on the 55-mile Kirkuk-Tosloojoh highway, and other road projects are being surveyed now.

• **Turkey** received an additional $5 million in U. S. aid for road construction, bringing total U. S. aid to $35 million. West Germany's Krupp Steel Company is to build the $71-million Bosphorus suspension bridge. Financing for the span is partly in the hands of West Germany. Whereas only 289 highway bridges were built in Turkey in the 27 years prior to 1950 ,work has started on no less than 732 bridges since 1950 and almost half of those are now completed.

• **Israel** is planning construction of a road across the Negev desert to link the potash-producing Dead Sea area with the port of Eilath, on the Gulf of Aqaba.

(*Continued on page* 200)



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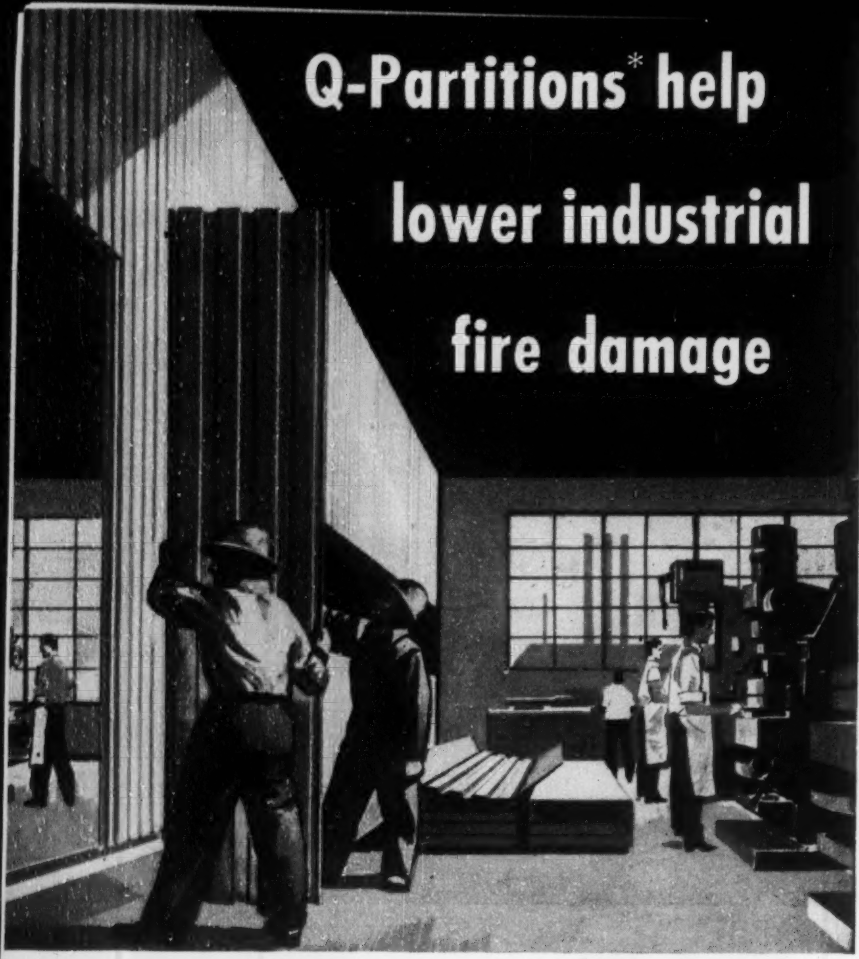
Q-Partitions* help lower industrial fire damage

Fire prevention experts agree that one way to prevent costly industrial fires is to reduce large areas by the use of fire-resistive partitions. By doing so, fires that would tend to spread swiftly can be contained in a smaller area where they can be fought more effectively and brought under control. Robertson Two-Hour Fire Resistive Q-Partition is ideal for this purpose. Its installation will not interrupt production schedules . . . it is quick, clean, dry construction. It goes up while production goes on. And because it is clean and dry, there is no discomfort to employees, nor is there danger of dirt and dust injuring precision instruments or machines.

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The country hopes to complete a network of district roads now under construction, and on April 1 of this year will offer in the U.S. a $350-million bond issue to provide a major source of capital for boosting the country's industry, transportation, and agriculture.

• **Pakistan** has revised drastically an $850-million, six-year development plan in order to raise roadbuilding to major importance. The revised version provides $150 million for highway construction involving some 16,000 mi of road. Australia and the U.S. will lend special technical assistance and machinery for the plan. Five agreements have been signed recently with the U.S. Foreign Operations Administration for financing national development. A general program for East Pakistan will involve a $750,000-fee for an American engineering firm to design and supervise construction.

• **Afghanistan,** having almost completed the U.S.-aided Helmand Valley irrigation project, will turn to road development this year. Surveys are being made for construction of a tunnel through the Hindu Kush mountains to lend rapid direct access to the northern part of the country and the Russian border.

• **India** has proposed spending $210 million on transport development in the next three years. The program is part of a $½-billion overall national development in which village, state, and federal governments cooperate. India will receive special economic aid and further technical assistance for road development under a new U.S. aid program. Noteworthy items in the highway plan are a new $33-million bridge across the Ganges River and a $7.5-million tunnel under the Pir Panjal mountains to link Kashmir and India.

• Asia

• **Burma,** in an overall $1-billion, 10-year development program will continue highway construction already under way. Money for highways actually will be a very small part of the total.

• **Indonesia** is in the third year of a five-year program to construct 1,000 miles of new highways in addition to improving existing roads. U.S.'s Export-Import Bank has made loans exceeding $32 million for road construction.

• **Malaya** has announced a ten-year, $184-million highway program in which $135 million will be spent on a 200-mile road spanning the Malayan peninsula. The U.S. is providing

(*Continued on page 201*)

loans for a large part of the construction financing.

- **Japan** has inaugurated a five-year, $650-million road program for paving and improving more than 26,000 miles of highway. A further plan is in the works for taking up again the long-delayed Tokyo-Kobe expressway. This 320-mi highway has an estimated cost of $277 million.
- **Korea,** with the assistance of the of the United Nations Korean Reconstruction Agency, plans a five-year, $245-million program for the reconstruction and improvement of 2,703 bridges and the construction of 460 miles of new roads.
- **The Philippines** have under way the construction of a trunk highway system to open up the rich agricultural province of Mindanao. The U.S. is aiding the work with $8.4 million in grants.
- **Thailand** has voted $14 million immediately for construction of strategic roads. The country has a U.S. aided five-year plan for the construction of 6,000 miles of highway at an estimated cost of $51 million. The World Bank is discussing additional financing to implement the program.
- **Australia** is spending approximately $50 million annually on highways, while the state of Victoria has announced a long-range $300-million plan for the modernization of its road system. U.S. has loaned the country $150 million for national development. Australia has a land area nearly equal to that of the U. S., but only 80,000 miles of state, trunk and main roads between cities and towns. Only 18,000 miles of those roads are paved with a hard surface. In the next few years the country should move into an accelerated highway construction program.
- **New Zealand** has announced plans to spend $53 million yearly for the next ten years on road and bridge development.

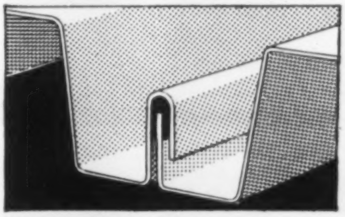
• Africa

- **Egypt** adopted a ten-year, $90-million road construction program covering more than 2,200 miles of new highway. First part of the program, a two-year phase, was inaugurated, and $20 million was allocated to carry it out. U. S. technical assistance is aiding in survey and design.
- **Ethiopia and Eritrea** are engaged in a large scale, coordinated plan to carry out rehabilitation and construction of their highway networks. Ethiopia, with World Bank and U. S. aid, is bringing to completion the improve-

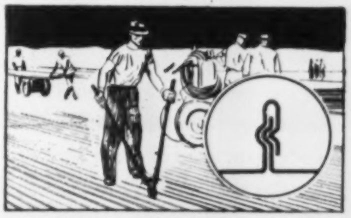
(*Continued on page 204*)

Quickly erected Q-Deck helps lower roof fire hazard

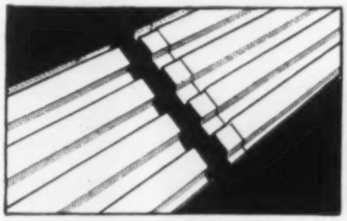
The many unique features of Robertson Q-Deck make it of special interest to the architect and engineer who is concerned about the fire hazard aspect of his flat roof design. To begin with, Robertson Q-Deck is designed with tight side and end laps to eliminate the need for an inflammable vapor seal. Its two-foot width and long span characteristics mean fewer joints, and its zinc-coated surface (or basic Galbestos) eliminates the need for field painting.



Robertson Q-Deck side laps are designed to form a standing seam. A seal in the form of a continuous caulking material assures a vapor-tight joint.



A special Robertson clamping tool mechanically fastens the side laps together, forming a steel fire barrier that remains intact as long as the structural supports are in place.



Ends of Robertson Q-Deck are sized and countersunk to produce a tight, smooth, two-inch lap joint. This lap, along with the tight side laps, provides a vapor-sealed roof construction.

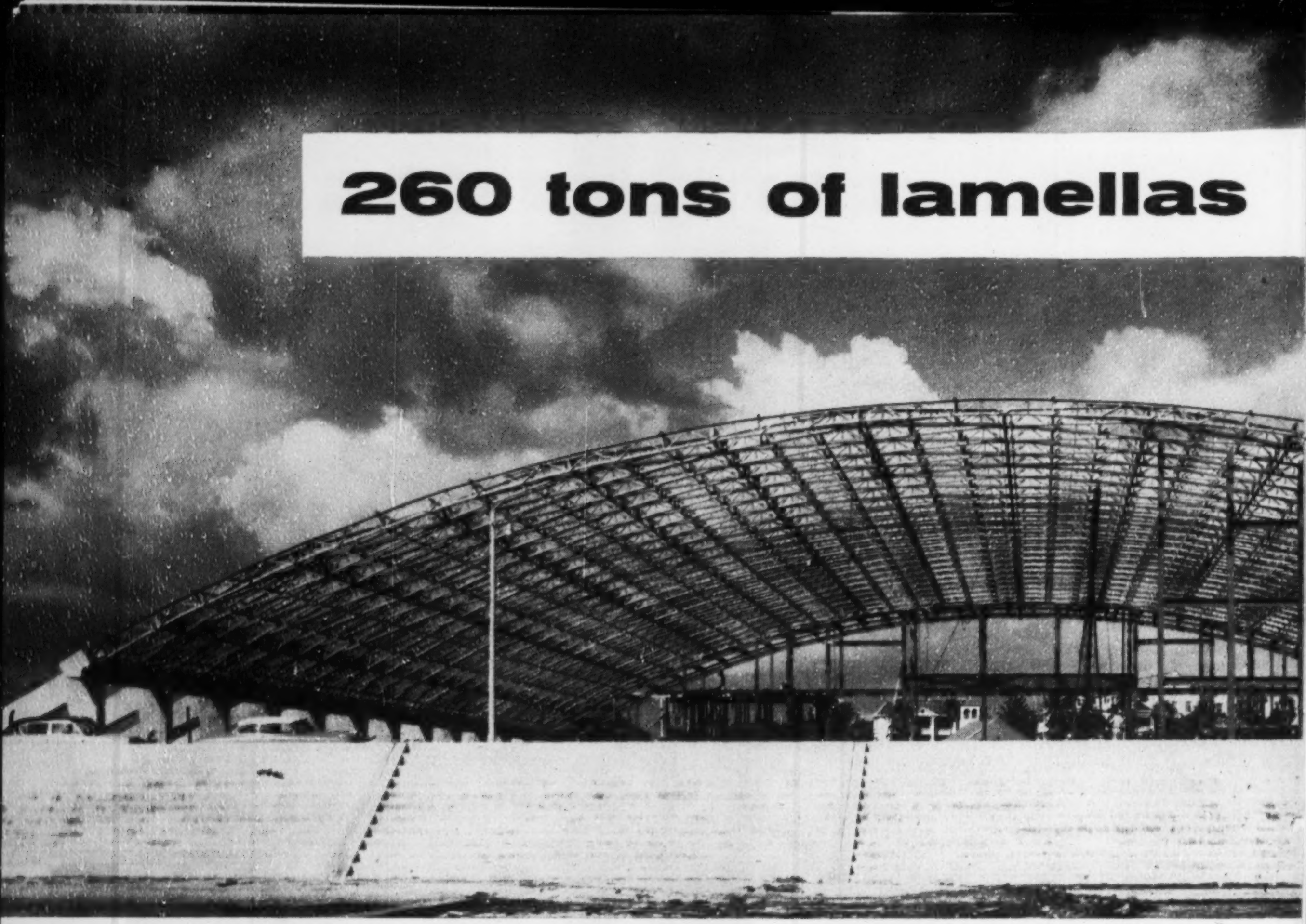
Excessive amounts of asphalt are eliminated on Robertson Q-Deck because the adhesive is applied to the *insulation . . . not to the steel deck.* This also results in a better bond between the steel and the insulation.

Robertson
Q-DECK
a product of H. H. Robertson Company

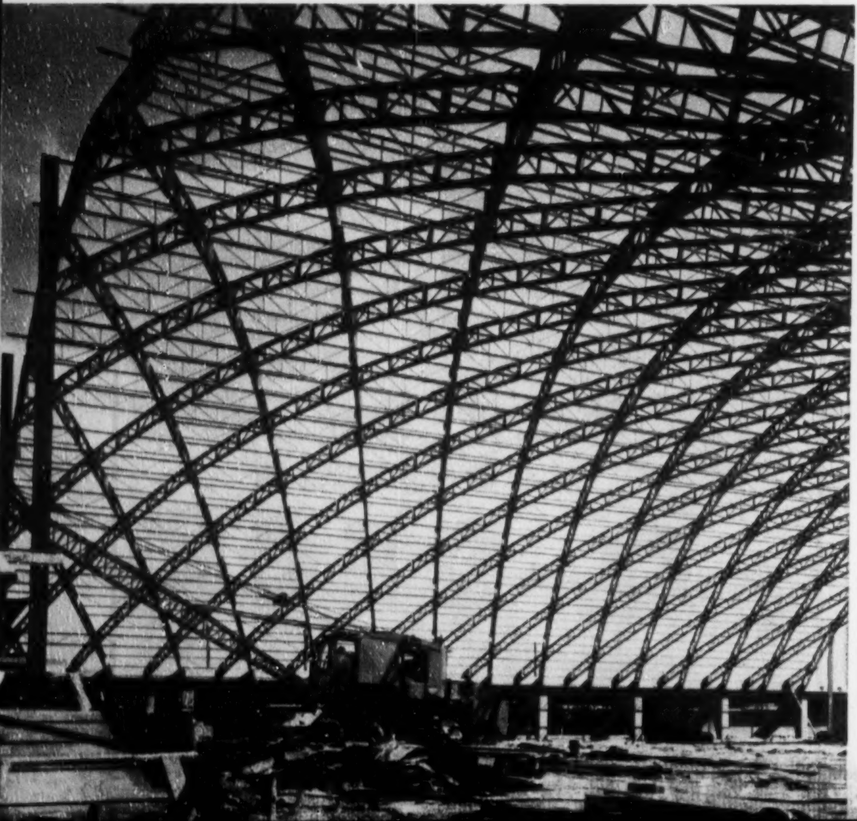
2420 Farmers Bank Building • Pittsburgh 22, Pennsylvania
In England—Robertson Thain Limited, Ellesmere Port, Cheshire
In Canada—Robertson-Irwin Limited, Hamilton, Ontario

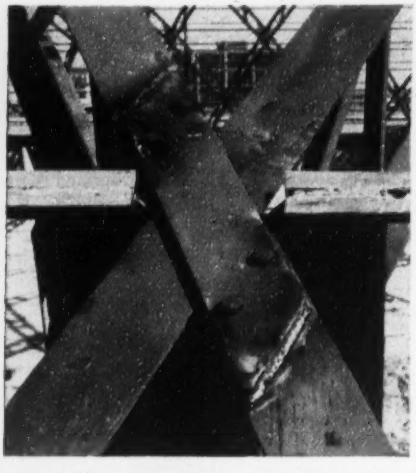
World-Wide Building Service

260 tons of lamellas



ROOF STRUCTURES OF TEXAS, with offices at Austin and Houston, holds the contract for the auditorium roof. Lamella roof design and details prepared by G. R. Kiewitt and Hale & Harvie, Consulting Engineers, St. Louis. Designers of the foundation and general building work, exclusive of the roof structure, were Blucher and Naismith, Structural Engineers of Corpus Christi. Lamella units fabricated by Columbia Iron Works, St. Louis, and the purlins by Tips Engine Works, Austin. Richard S. Colley is the architect, and Walsh Construction Co., the general contractor—both of Corpus Christi.

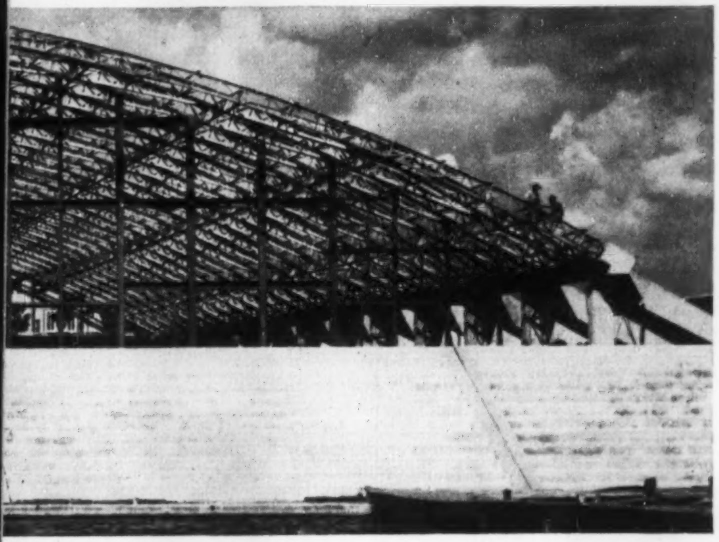


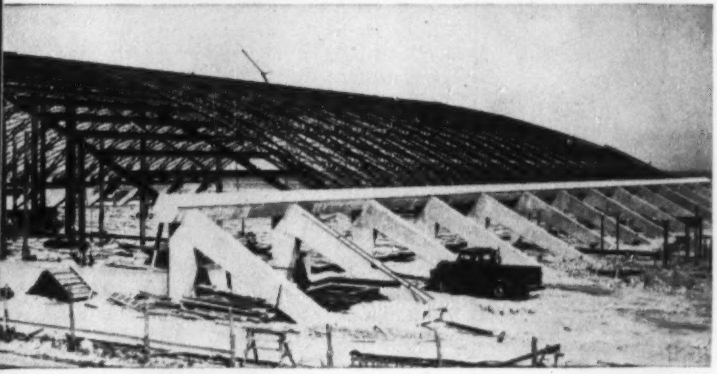


THE ARCHES AND PURLINS are open web members of Structural Steel, 24 in. deep. Except for the high tensile bolts which were used to erect the arches, the framing is all-welded.

LAMELLA CONSTRUCTION—unusual in that the main members span supports on a skew, forming diamond-shaped areas between the intersecting members.

# of USS Structural Steel erected in 25 days





THE MAIN MEMBERS—circular steel arches—spring from concrete buttresses along the sides of the building. They span 224 ft. with a rise of 30 ft., providing a 42 ft. clear height at midspan. Main and intermediate purlins are spaced about 6 ft. apart.

It took just 25 working days for the Gulf Erection Co., of Houston, Texas, to erect 260 tons of structural steel, covering 65,000 sq. ft., for the arched roof of the Municipal Civic Auditorium in Corpus Christi, Texas.

A somewhat unusual type of construction, known as lamella, was used. The main members span the arch on a skew, forming diamond-shaped areas between the intersections. The lamella units were identically fabricated, except for being right and left hand. This, plus the fact that only two types of purlins were required, simplified fabrication and erection considerably. Falsework was necessary only to erect the first few members. The succeeding members were erected with a crane.

This is the type of application in which versatile USS Structural Steel excels. It is extremely tough, yet is the most economical of load-carrying materials. It will withstand more abuse than other structural materials, effectively resisting tension, compression, torsion, and shear. Enclosed in buildings, Structural Steel will last indefinitely—requiring no maintenance. Equally adaptable to riveting, welding or bolting, it can be erected in any weather in which men can work. And because steel members are fabricated indoors, weather can have no effect on the quality of workmanship.

Write today for complete information on construction with steel—United States Steel Corporation, 525 William Penn Place, Room 4290, Pittsburgh 30, Pennsylvania.

UNITED STATES STEEL CORPORATION, PITTSBURGH · COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. · UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
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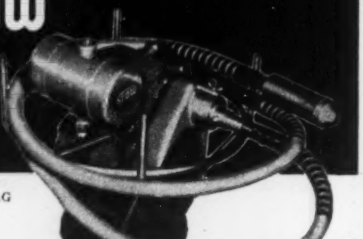
USS STRUCTURAL STEEL

USS

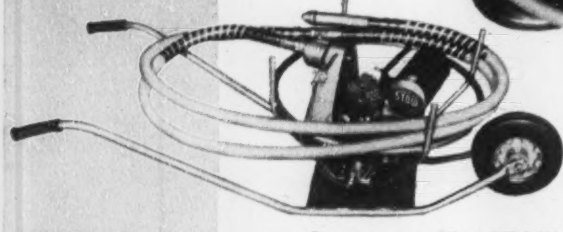
4-474A

UNITED STATES STEEL

New performance features built into STOW CONCRETE VIBRATORS



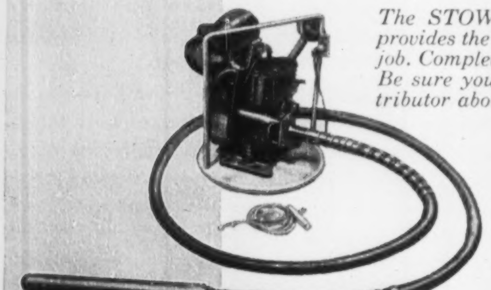
MODEL AG



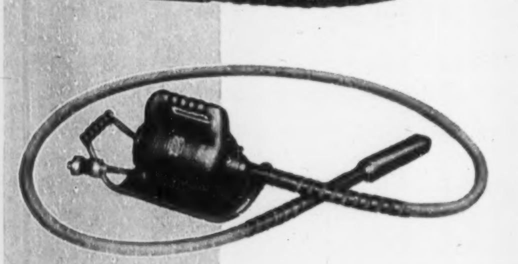
SHOWN: MODEL BGW. This is the standard STOW model BG vibrator, mounted on wheelbarrow for easy maneuverability. Model BG & BGW feature 2 HP 4 cycle, air-cooled engine; ball-bearing eccentric belt tensioner.

Contractors like STOW vibrators because the high operating speeds of this new STOW vibrator line make possible the use of heavy duty, light weight flexible shafting, and lighter, more efficient vibrator heads. And STOW design provides convenient speed control so that attachments for rubbing, grinding, cleaning may be used directly on the vibrator shafts, making it unnecessary to purchase extra shafts for this purpose.

The STOW line is complete . . . provides the right vibrator for every job. Complete accessories available. Be sure you see your STOW distributor about the STOW line!



MODEL J—The lowest priced vibrator in the STOW line. Slower speed means longer, trouble-free operation. Model J features 3600 (max.) VPM, 2 HP 4 cycle air-cooled engine, and direct drive.



MODEL BU—Features 2 HP at 9000 VPM, operates on 115 volts AC or DC with splash-proof, high speed ball-bearing motor.

See how STOW can save money for you! Send for Free Bulletin 511.

STOW MANUFACTURING CO.
19 Shear Street, Binghamton, N. Y.

ment of 2,800 miles of highway, and now plans a 10-year supplemental program for the construction of 2,700 miles of new secondary roads. Eritrea is building 800 miles of new highway in coordination with Ethiopia's program.

- **French West Africa and French Equatorial Africa** both are engaged in national development plans, a large part of which centers around highway development. French Equatorial Africa is in the first phase of a 10-year plan to build 8,500 miles of highways, and French West Africa is spending $20 million of an $85-million development fund on her roads.
- **Gold Coast,** to be a major bauxite producer in the near future, spent more than $25-million on roads in 1953. The figure is triple the previous year's expenditure.
- **Liberia** started the second year of a road improvement plan which involves the construction of 800 miles of new primary roads. Export-Import Bank loans and U. S. technical assistance are lending assistance in the program.
- **Belgian Congo** has in full swing a ten-year development program which includes not only highway rehabilitation but also 10,000 miles of new roads. World Bank loans to the plan total $70 million. This country and Kenya, Tanganyika, and the Union of South Africa are principals in a Pan African Highway program which envisages a system of interlocking national roads.
- **Kenya** announced long-range plans for the construction of a Great North Road to be a major link in connecting North and South Africa. Also included in Kenya's plan is an east-west road to open interior areas to Mombasa, the major port.
- **Sudan** is planning a five-year, $95-million development program in which $26 million is to be spent on communications and transport. The Sudan has been self-governing for just over a year, since England and Egypt signed a pact which ended their 54-year joint-rule over the country.
- **Tanganyika** is in the middle of a six-year development plan, half of which is centered on road construction. Five major road projects are now under way, and eight more are under consideration.
- **Union of South Africa,** aided by the World Bank, has completed 1,300 miles of road as part of the Pan African Highway system. South Africa will construct 250 miles of new highway yearly for the next few years at an annual cost of $17 million.

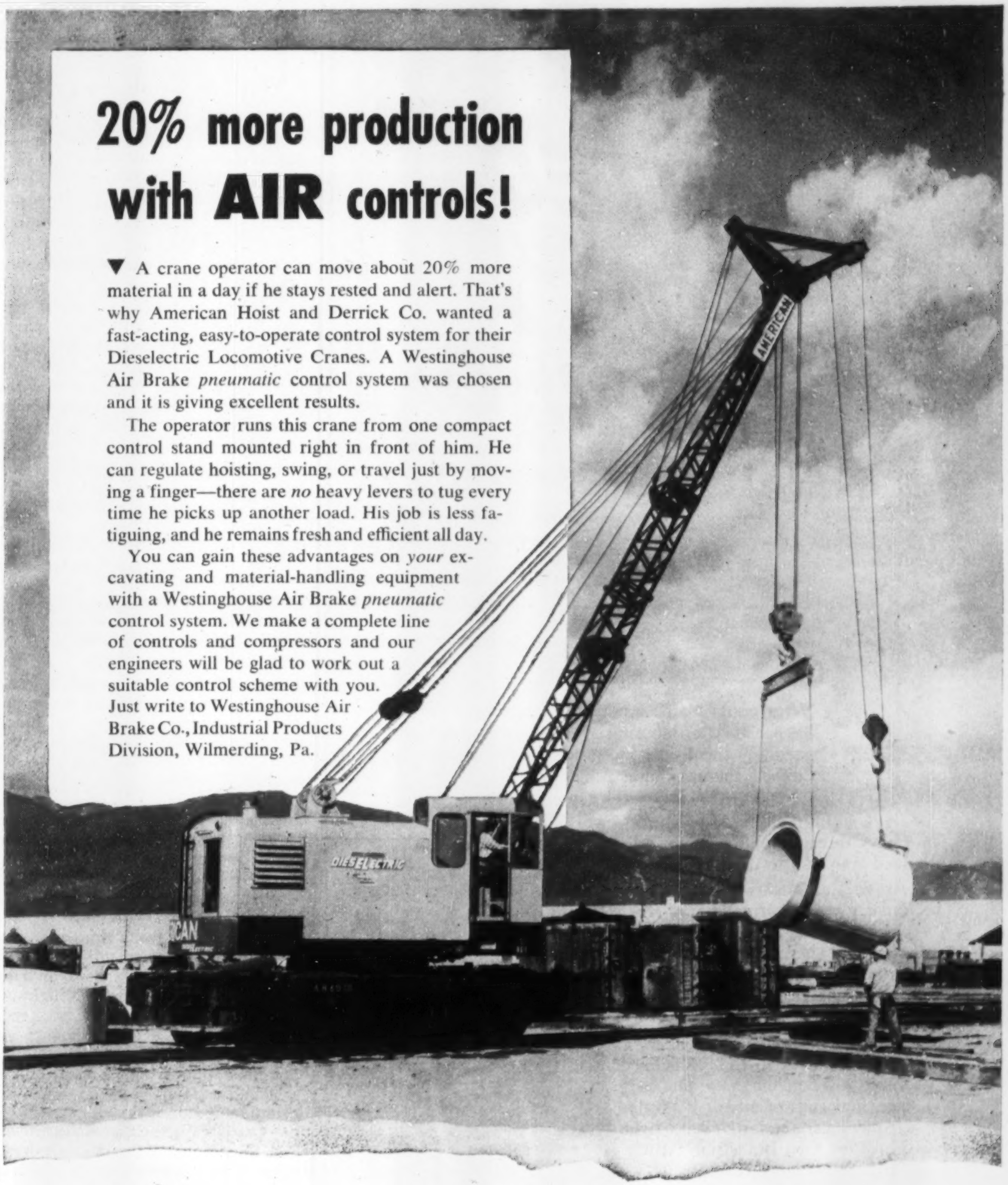
(*Continued on page 206*)

20% more production with **AIR** controls!

▼ A crane operator can move about 20% more material in a day if he stays rested and alert. That's why American Hoist and Derrick Co. wanted a fast-acting, easy-to-operate control system for their Dieselectric Locomotive Cranes. A Westinghouse Air Brake *pneumatic* control system was chosen and it is giving excellent results.

The operator runs this crane from one compact control stand mounted right in front of him. He can regulate hoisting, swing, or travel just by moving a finger—there are *no* heavy levers to tug every time he picks up another load. His job is less fatiguing, and he remains fresh and efficient all day.

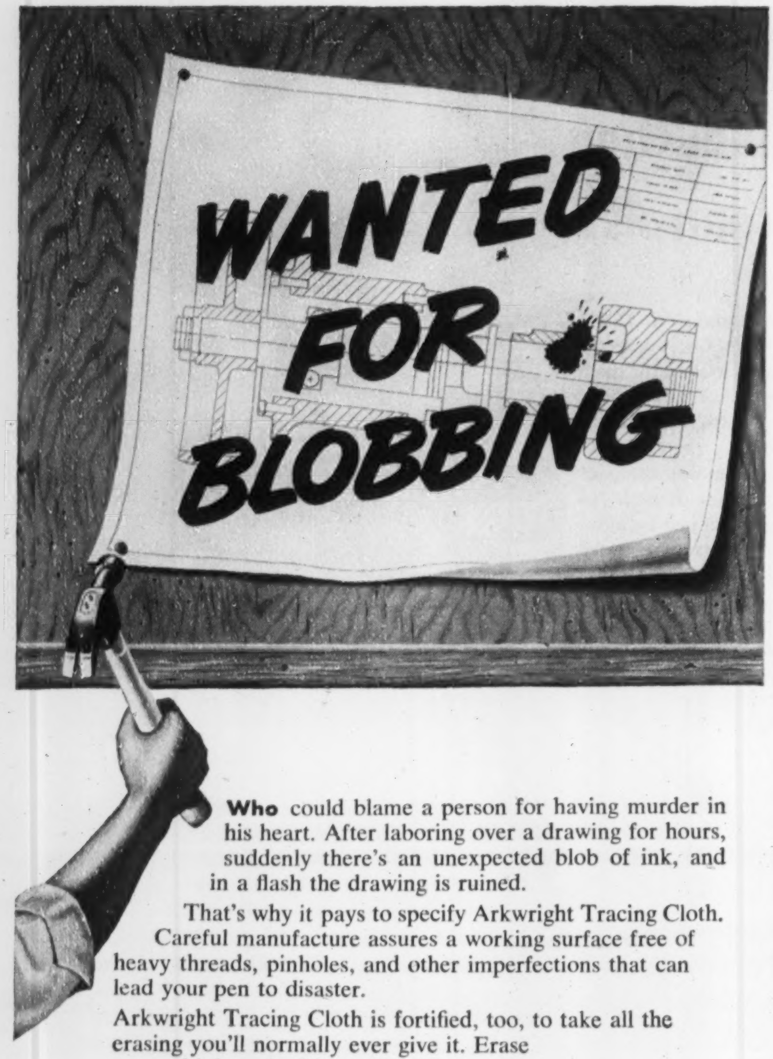
You can gain these advantages on *your* excavating and material-handling equipment with a Westinghouse Air Brake *pneumatic* control system. We make a complete line of controls and compressors and our engineers will be glad to work out a suitable control scheme with you. Just write to Westinghouse Air Brake Co., Industrial Products Division, Wilmerding, Pa.



THIS MODEL 830 American Dieselectric Locomotive Crane moves material faster because it is easy to operate. A labor-saving **Westinghouse Air Brake Pneumatic Control System** enables the operator to work at top speed all day.

Westinghouse Air Brake
COMPANY

INDUSTRIAL PRODUCTS DIVISION **WILMERDING, PENNA.**



Who could blame a person for having murder in his heart. After laboring over a drawing for hours, suddenly there's an unexpected blob of ink, and in a flash the drawing is ruined.

That's why it pays to specify Arkwright Tracing Cloth. Careful manufacture assures a working surface free of heavy threads, pinholes, and other imperfections that can lead your pen to disaster.

Arkwright Tracing Cloth is fortified, too, to take all the erasing you'll normally ever give it. Erase . . . and ink again. Lines will still come out sharp and clear — without "feathering". That's why Arkwright Tracing Cloth is ideal for good, readable blueprints.

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AMERICA'S STANDARD FOR OVER 92 YEARS

• Western Hemisphere

• **Canada's** highway construction cost almost $\$\frac{1}{2}$-billion in 1953 and is due to rise above that figure this year. Authorization in 1953 for construction of the Trans-Canada Highway, in the nine participating provinces, amounted to $140 million. The 5,000-mile project is scheduled for completion in 1956.

• **Argentina** initiated a road program which includes the construction of some 1,600 miles of highway at a cost of $100 million.

• **Bolivia** has almost completed the $45-million, 300-mile Cochabamba-Santa Cruz highway. To be finished this year, this highway construction was aided with Export-Import Bank loans. Sections of the Pan American Highway were opened in the last year.

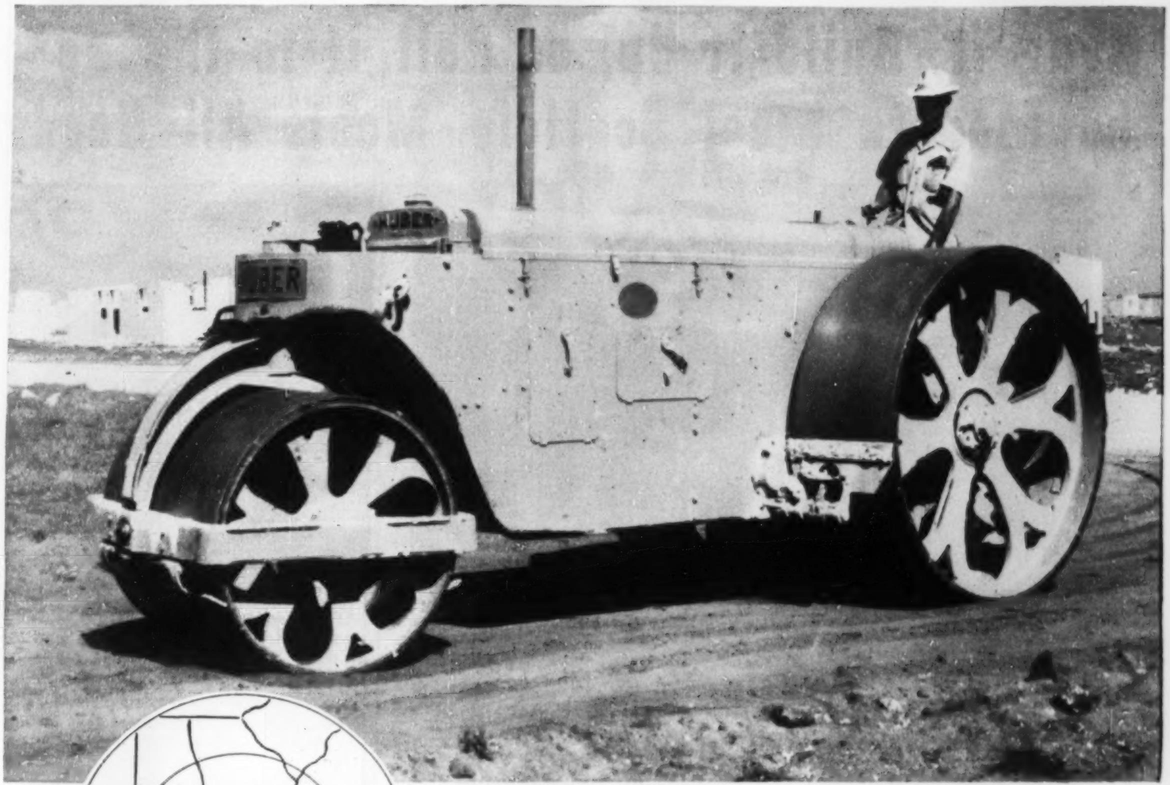
• **Brazil** has undertaken a large-scale highway development program in the state of Rio de Janeiro with some aid coming from World Bank loans. During the last few years Brazil has been carrying on a huge development program, a large part of which has to do with highway construction and improvement. Some of the major items in the highway program are to be finished this year. U. S. loans to Brazil for the national development programs are still outstanding at $300 million.

• **Chile** is studying a program, outlined by a World Bank survey team, to carry out a ten-year, $300-million public works program. More than half of the money involved would go into construction of a market road system.

• **Colombia** is in its third year of a $100-million highway program partly financed by the World Bank and the U. S. The country's first toll highway, between Bogota and Chia, was opened. Highway improvements are stressed in the 1954 national budget, and roadbuilding costs are to exceed $50 million this year, according to government authorities.

• **Central America countries** all expect to complete their unfinished sections of the Interamerican Highway this year. Total cost of the highway from the U. S. border to Panama will be around $100 million—U. S. financing a third. Guatemala has inaugurated, in addition to work on the Interamerican Highway, a four-year program to construct 750 miles of roads. El Salvador and Honduras are considering a plan to build a $10-million highway to connect the Caribbean seaports in Honduras with the Pacific coast ports of Salvador. Nicaragua

(*Continued on page* 209)



Florida Contractor Holds a winning Pair... TWO HUBERS

SECOND HUBER 10-TON ROLLER HELPS FIRM EXPAND

A Miami, Florida contractor who has built streets for many residential developments is the owner of two Huber rollers — a winning pair.

Five years ago the company bought its first Huber 10-ton three-wheel roller. The second one was added in 1951.

The procedure used on many projects is to sprinkle and roll an 8-inch course of lime rock to a smooth, hard surface which then is swept and sealed with asphalt at the rate of 3/10 gal. per square yard. This is covered with screenings or coarse sand.

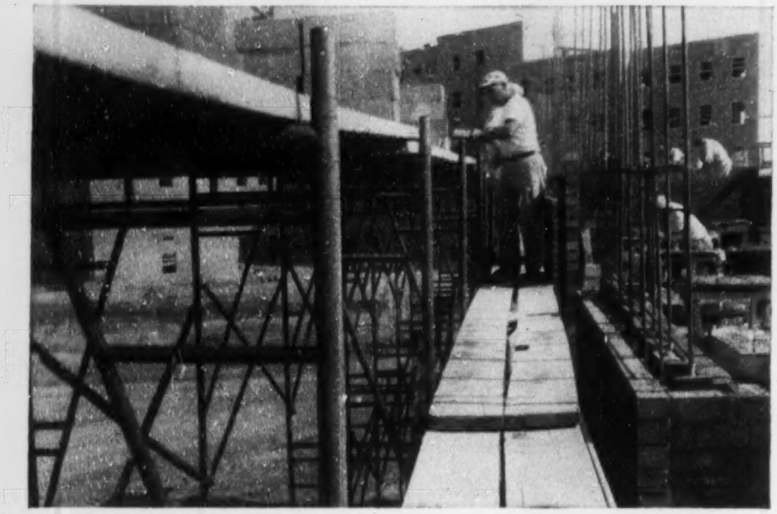
This firm's experience with Hubers is typical, for Huber rollers make friends wherever they are used. Expert design and quality construction pay off in terms of fast, powerful and dependable service. Talk to your nearest Huber Distributor about dependable Huber road machinery. You, too, will like it.

HUBER MANUFACTURING COMPANY
MARION, OHIO, U.S.A. — Since 1863

HUBER

MANUFACTURERS OF HUBER MAINTAINERS, GRADERS AND COMPLETE LINE OF ROLLERS

Hang it, Build it Up, or Roll it to the Job; The Modern Steel Scaffold Meets All Needs



BUILT-UP FOR MASONRY WORK, this "Trouble Saver"® Sectional Steel Scaffolding speeds construction on the new Veterans Administration Hospital, Sepulveda, Calif. 3000 of the 6'6"-high, 5'-wide "Trouble Saver" frames were rented and erected by general contractor Gust K. Newburg. 20"-wide sidewall brackets support the adjustable mason platform; put men within easy reach of materials. "Trouble Saver" Scaffolding, distributed by PS Co. on a rental or sale basis, is described in free Bulletin PSS-24.

HANGING SCAFFOLDS were used at the Bromley Park Housing Project, Roxbury, Mass., by general contractor M. S. Kelleher Co. 5 ft.-wide "Gold Medal"® Safety Scaffolding Machines provided a safe, unobstructed, adjustable working platform. 180 machines were used. "Gold Medal" Junior Safety Swinging Scaffolds are often used for washing down brickwork. For details on both types of Scaffolds, ask for Bulletins SS-1 and J-6.

THESE PRACTICAL EXAMPLES of PS Co. Scaffolding providing safe footing for construction workers are typical of PS service. No matter where the job is located, the *right* scaffolding is quickly available from Patent Scaffolding Co. Whether the job is simple and small or goes steeplehigh; involves uneven terrain or requires mobility, contractors can always rely on PS—the only complete line. It pays to remember—when it comes to scaffolding, come to PS.

FOR GREATER SAFETY...EFFICIENCY...ECONOMY

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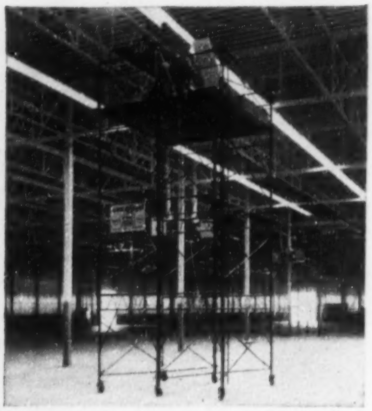


ROLLING SCAFFOLDS ARE "DOLLAR SAVERS", according to J. B. Shamel of California Electric Construction Co., who used 25 of these "Trouble Saver" Rolling Scaffolds to expedite overhead installations at North American Aviation's El Segundo plant in California. For details on dozens of time saving uses, request free Bulletin PSS-14.

ENCLOSING A FAMOUS EDIFICE, these erectors are installing "TubeLox"® Scaffolding for repair work on New York's famous Grace Protestant Episcopal Church. 31,612 lineal ft. of tubing and 5,828 couplers were used. "TubeLox" Scaffolding can be built-up to almost any height, conforms to any contour. Ask for free Bulletin 10-PTS.

To help you solve any scaffolding problem, PS offers a complete nation-wide engineering service—available locally. See the Yellow Pages in your 'phone book for the nearest Patent Scaffolding office or representative handling "Gold Medal" Scaffolds.

received $4 million in loans from the World Bank to finish out a $6-million farm-to-market road development begun in 1951.

- **Mexico** spent $52 million in the first eight months of 1953 on highway and farm-to-market road construction. The accelerated road program has been going on for several years and will continue for some time. The big item in the work is the Trans-isthmian highway between Coatzacoalcos, on the Caribbean, and Tehuantepec on the Pacific Coast. Mexico has started work on a new highway, through Yucatan, extending from the Caribbean terminal of the Trans-isthmian Highway to a proposed ferry terminus to connect with Cuba. When this 200-mile, $35-million highway is completed in 1955, tourists can drive from Texas to Havana, Cuba, taking a ferry between Yucatan and Cuba.
- **Cuba** has carried out—in the last two years—an $80-million national development program, a large part of which went into 1,000 miles of roads and bridges.
- **Ecuador** has awarded contracts for the balance of its section of the Inter-american Highway. Export-Import Bank and the World Bank have aided in the highway work and in secondary road construction. World Bank will loan the country $8 million to aid in port construction and highway development in Guayas province.
- **Paraguay** is working out problems with Brazil in the financing of a 130-mile highway to join the two countries and to provide Paraguay with its first highway access to the sea.
- **Peru** has spent $22-million on highways since the national road plan was inaugurated two years ago. The Interamerican Highway is under construction in many sections, and a special allotment has been made for the improvement and maintenance of the Trans-Andean highway to the river port of Pucallpa.
- **Venezuela** has announced plans to construct in the next five years a huge coastal highway linking eastern and western Venezuela. The project would include a 10-mile tunnel running from Puerto La Cruz de Limon nearly to Choroni in the State of Aragua. For other work the Venezuelan government has alloted $85-million for road and bridge construction this year. The $60-million Caracas-LaGuaira expressway was completed last year.

• Europe

- **Austria** started construction of an

(Continued on page 210)

introducing—

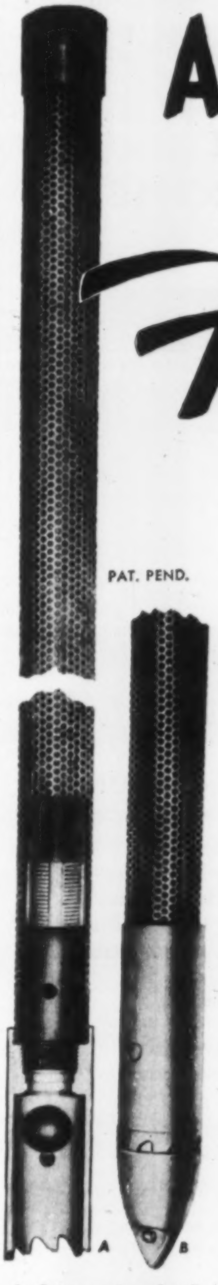
A NEW DESIGN

That Leaves All the Others Far Behind!

"Foundation's" NEW

Freeflow

WELLPOINT



A—Cutaway view of wellpoint showing details of its construction.

B—Jet head end of wellpoint showing special jetting plug attached, for use in unusually tough soil conditions.

IT'S ABOUT TIME!

"It's about time!" say the contractors who have used it . . . justifying the years of research and field work our engineering staff has put into the development of the sensational new Freeflow Wellpoint.

The industry has needed a wellpoint that:

- Eliminates the fantastically high cost of wellpoint maintenance and repair.
- Eliminates the rusting action that cuts wellpoint life.
- That has an unobstructed, *free flow* of water, giving the highest capacity possible, and proper size and lightness for easy handling.
- That has a fine mesh screen that does not pull away from the outer brass jacket to permit entrance of sand or silt.

"It's about time!" The industry has needed it and Foundation is proud to offer it. Write for literature illustrating and describing the features of the new Freeflow Wellpoint.

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A UNIQUE
APPLICATION
OF THE TOGGLE
PRINCIPLE

Lipe

CONSTANT-CAPACITY CLUTCH

Based on a unique application of the toggle principle, this LIPE constant-capacity CLUTCH compensates for wear of friction material . . . compensates for fading pressure of expanding springs . . . never loses torque capacity while there is a reasonable amount of friction material left to hold. The constantly increasing leverage of the toggle — which never goes over center—builds up pressure in almost direct ratio to these losses.

Toggle Action Insures Smooth Engagement

Despite its multiple pressure action and positive drive, the engagement of this clutch is gentle and chatter free. This is due (1) to the fact that the initial energy of the springs is partly absorbed by the toggles, and (2) to the fact that the rate of engagement is slowed by the reduced speed of the toggle as it approaches center.

High thermal efficiency is assured by a massive plate, ribbed for faster radiation, and cooled by positively generated air currents.

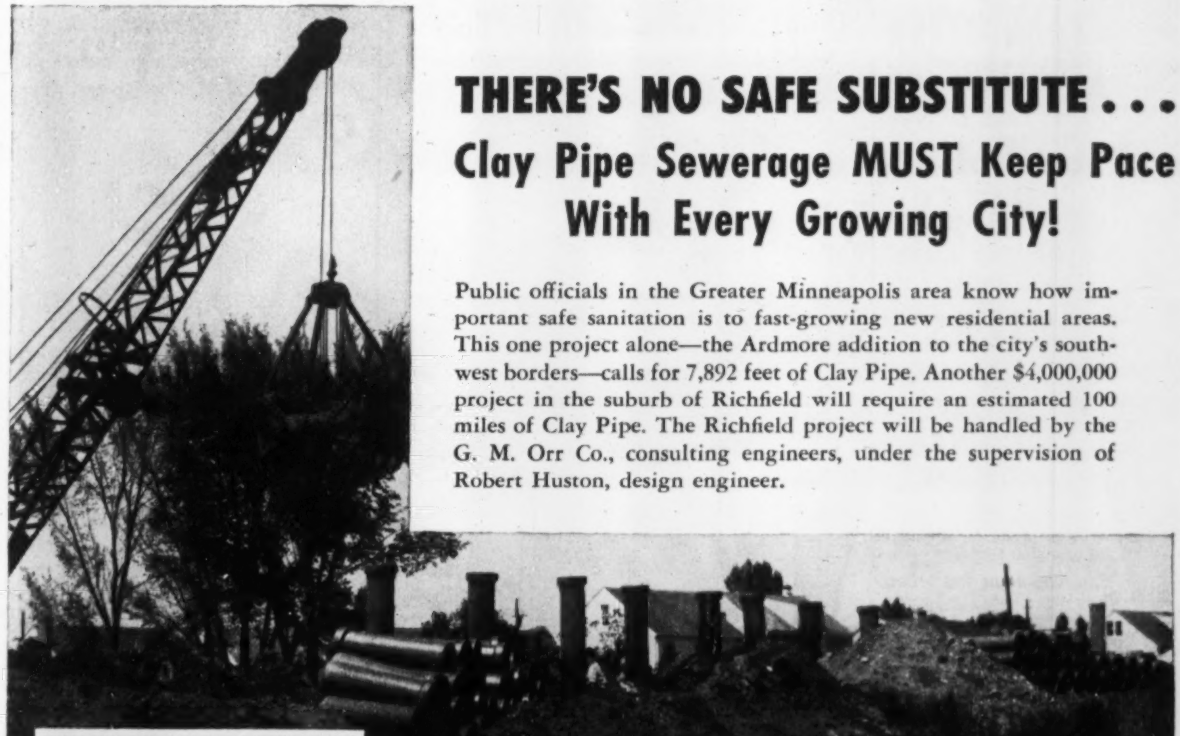
It's a clutch that is bound to change your ideas about clutch design, capacity and service. Write for specifications and performance data.

LIPE ROLLWAY

Lipe-ROLLWAY CORPORATION
Manufacturers of Automotive Clutches and Machine Tools
Syracuse 1, N. Y.

$80-million four-lane expressway from Salzburg to Vienna. The highway will connect with the German-built expressway from Munich to Salzburg. Highway expenditures amounted to $70 million in 1953.

- **Britain** launched a $2.7-billion highway program, the first since 1939. To take several years, the plan calls for more improvement than new construction.
- **Denmark** is studying a West German proposal to construct a 16-mile tunnel under the channel separating the Danish island of Laaland from the German mainland. Cost of the project would run around $200 million.
- **France** created an authority for financing its share of the proposed $27-million Mont Blanc tunnel, and also increased the funds for modernizing the French road system.
- **Greece** announced a four-year plan for reconstruction of 1,000 miles of secondary roads and construction of 750 miles of new roads at a total cost of $18 million.
- **Italy** started construction of two expressways designed to promote trade with Switzerland and France. Estimated cost of the two is $46 million. Southern Italy is constructing 1,400 miles of new roads and repairing 6,700 miles of existing roads over a four-year period. The work is partially financed by the U. S. and the World Bank.
- **Portugal** approved a six-year plan for the development of transport and communications. To tie in with booming hydroelectric development, the transportation plan will cost an estimated $260 million.
- **Spain** continued its five-year highway modernization program—now in its third year—and authorized an immediate $12 million for road construction early this year. The plan ties in with the U. S.'s $226-million economic aid grant in exchange for the right to build bases for U. S. air and naval forces in Spain.
- **Yugoslavia** has under way a full-scale redevelopment program, a large part of which centers around the nation's highway network. U. S.'s Ex-Im Bank has loaned $55 million and the World Bank $28 million toward the plan. The Yugoslav government is now planning an even bigger development program which envisions the spending of $2.3-billion spread over a ten-year period for construction of rail, sea, river, highway and air communications. Nearly $550 million would be designated for highway construction.



THERE'S NO SAFE SUBSTITUTE . . .

Clay Pipe Sewerage MUST Keep Pace With Every Growing City!

Public officials in the Greater Minneapolis area know how important safe sanitation is to fast-growing new residential areas. This one project alone—the Ardmore addition to the city's southwest borders—calls for 7,892 feet of Clay Pipe. Another $4,000,000 project in the suburb of Richfield will require an estimated 100 miles of Clay Pipe. The Richfield project will be handled by the G. M. Orr Co., consulting engineers, under the supervision of Robert Huston, design engineer.

Throughout the nation, Vitrified Clay Pipe is solving vital sewerage problems of areas confronted with "growing pains." Here are just a few of the reasons for this overwhelming preference for Clay Pipe:

PUBLIC OFFICIALS know that Clay Pipe is guaranteed for 50 years. It's a guarantee of safety and performance that is especially important when sewerage and drainage facilities are financed by bond issues.

ENGINEERS are assured their professional reputations will be enhanced by years of trouble-free service, because Clay Pipe can't be corroded by acid waste or sewer gases.

CONTRACTORS know they can count on Clay Pipe for fast, easy installation and ready availability.

The manufacturers of Vitrified Clay Pipe work constantly to make this fine product even better through research and testing. You can be sure you're getting the latest and the best when you specify Vitrified Clay Pipe. It's performance-proved . . . precision-produced . . . and permanently safe!

Vitrified CLAY PIPE

NATIONAL CLAY PIPE MANUFACTURERS, INC.
1520 18th St. N. W., Washington 6, D. C.

311 High Long Bldg., 5 E. Long St., Columbus 15, Ohio
703 Ninth & Hill Bldg., Los Angeles 15, Calif.
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CONTRACTORS' OFFICE TRAILER
Models 23½'—30'—35' Price $2170 to $3580
Birch finish, drafting table, 2 built-in desks with letter files & drawers, other conveniences. Can offer three years' finance plan. Write for pictures and plans.

TRAILER VILLAGE SALES, INC.
8642 Pulaski Highway, Baltimore 21, Md.
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CONCRETE
SAND AND CEMENT
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We own and operate 43 complete cement gun outfits. We have completed over 2600 exclusive GUNITE contracts.

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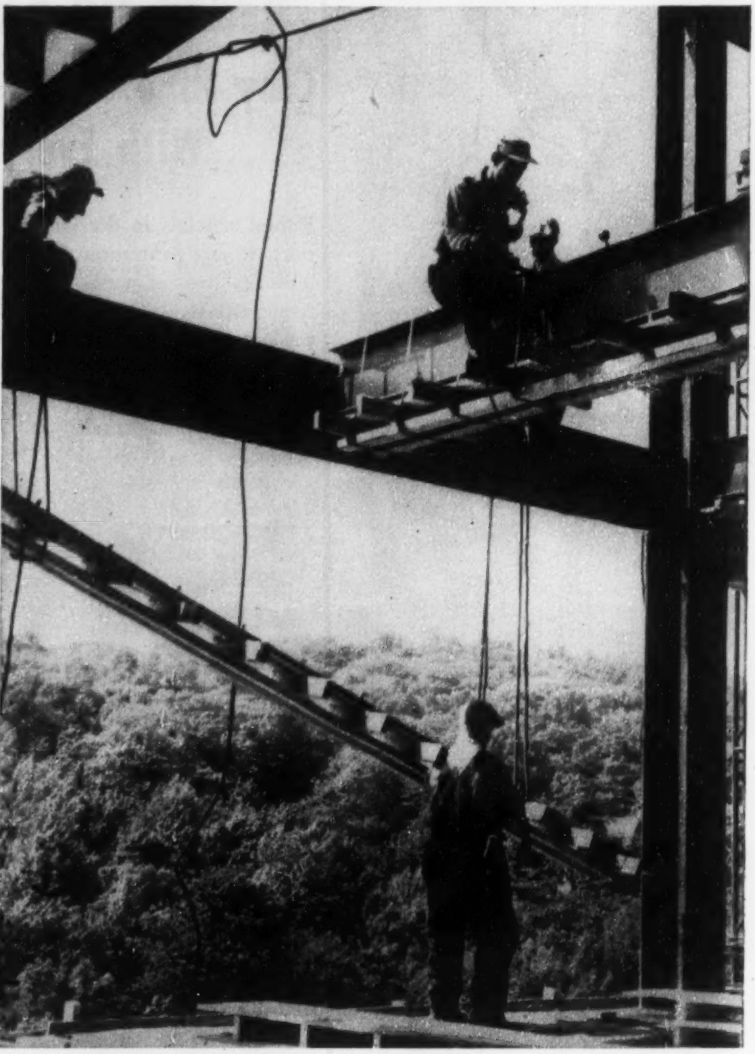
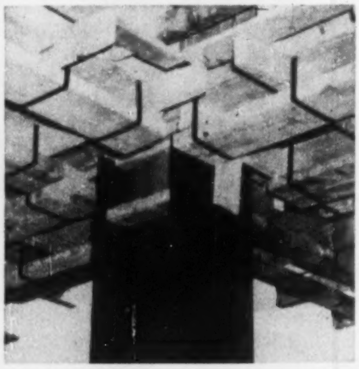


14 STRAPS EVERY FIVE MINUTES was the speed of operation in fastening forms at the new 21-story Montreal General Hospital. Worker uses automatic tensioning-fastening machine that is fed steel strap from portable coils.



FLOOR FORMS in place, the job is ready for pouring. Double straps are used where concrete must be forced into forms.

Fast fastening

Steel strapping of forms speeds hospital erection

By fastening floor joist forms to I-beams with steel strappings, construction men of Anglin-Norcross Corp., Ltd., Montreal, Que., were able to cut man-hours nearly 80 per cent, simplify tensioning operations and minimize material waste.

Assembling forms around steel beams involves the following operations: workers lift the base of a concrete form into position with a rope sling and temporarily secure the form to the beam. Metal spacers, 2 in. in

RUGGED
IN ROCK
Model 3500 owned by Babler Bros. on a tough cut near Drain, Oregon

MANITOWOC best for ANY job!

You can bid closer, without worrying about what soils you may encounter, because a Manitowoc takes 'em all in stride — dirt, rock, shale, gumbo, you get real cost cutting, big yardage performance.

Manitowoc's exceptionally rugged construction, fast operating cycles and simplicity of design pay off in more yardage, at lower net cost per yard. Before you bid your next job, remember it's better to bid with a Manitowoc than against it. Write for complete details.

Manitowoc Engineering Corp., Manitowoc, Wis.

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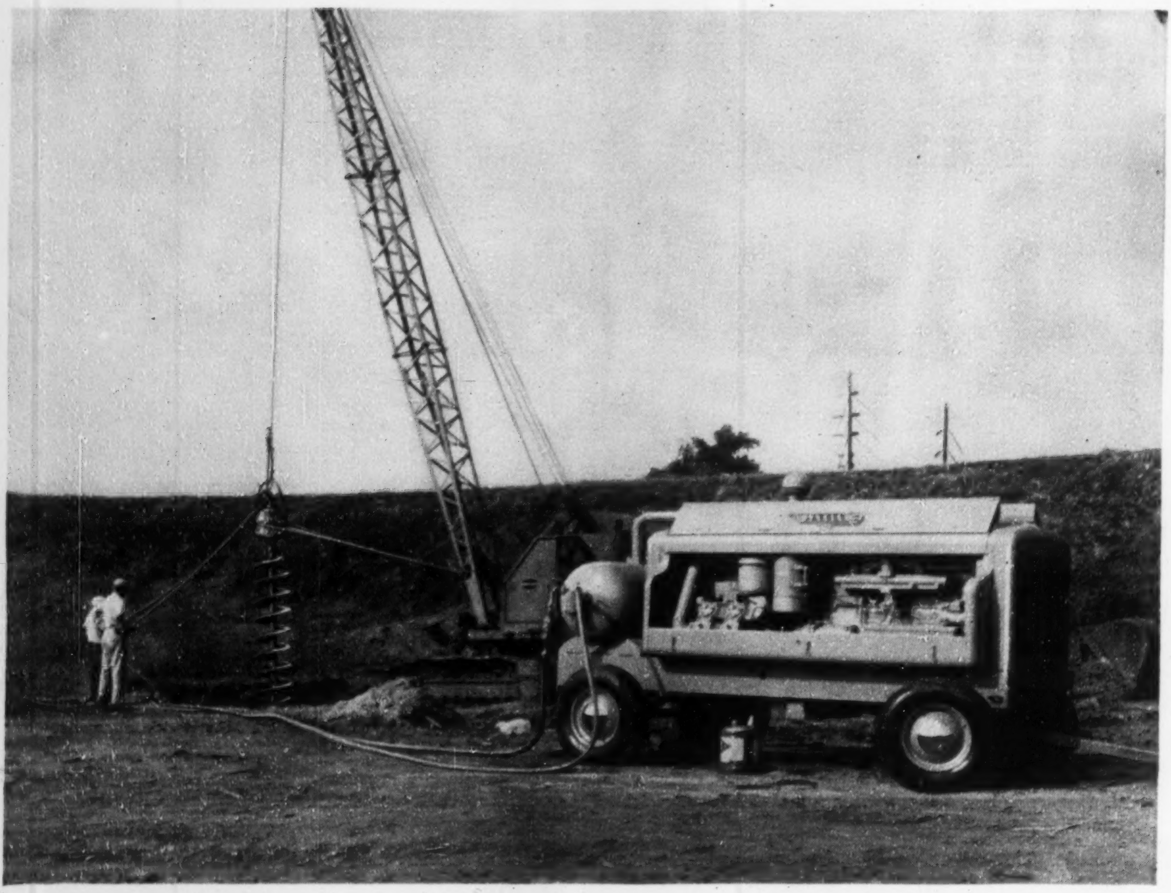
SHOVELS 1-5 YD.
Speedcrane
CRANES 18-100 TON

SPEEDY
IN SOIL
Model 4500, 6 yd. bucket on 140' boom, with Torque Converter, turns out 300 yds. per hour for Cook Const. Co., working near Chester, Ill.



Jaeger 365 has the "plus" air needed

Drilling 24" wick holes in blue muck

To drain and stabilize river bottom blue muck bordering Highway 51, the Leon B. Stilley Construction Co., of Marion, Ill., used a 24" auger to drill wick holes 25′ deep, spaced 25′ apart. (This was only the second time that sand wicks have been used in Illinois.)

To pull this auger in the sticky muck required a 15 hp air motor using 330 cfm of air @ 100 psi — too big a job for any "old standard" 315 compressor, but a natural for a Jaeger 365.

Jaeger, and Jaeger alone, is completely engineered throughout all ratings — 600, 365, 250, 185, 125 and 75 cfm — to match the air demands of modern tools. For example: Jaeger-engineered valves are 75% to 100% larger for free air flow and up to 10 times longer valve life. Valve seats and discs are machined on both faces simultaneously to parallel planes within 7/1.000,000 of absolute flatness. This exclusive method eliminates the distortions which "spring back" into valve discs under ordinary face grinding. You get positive leak-proof closure.

Ask your Jaeger distributor to show you the "plus" features of a Jaeger — its pressure lubricated, W-type compressor unit, its larger intercooler, air receiver, clutch and engine. They enable a Jaeger to deliver 15% to 25% more air than others at the lowest known cost per cubic foot. For full details, ask for Catalog JC-1.

THE JAEGER MACHINE COMPANY

200 Dublin Avenue, Columbus 16, Ohio

TRACTOR LOADERS • PUMPS • CONCRETE MIXERS • TRUCK MIXERS • PAVING MACHINES

height are mounted on top of each base in order to keep the forms evenly spaced below the bottom of the beam —the spacers remain in the concrete after the form has been removed.

The steel strapping is then applied around the beam and base and side forms are nailed to the bottom edge of the base form. Wood spacers are placed between side panels and steel beams.

When form hangers are in place the wooden floor forms are installed. Reinforcing steel is added, and floor and beam constructions poured simultaneously. The steel straps are cut after seven days and the forms removed.

With this success, the contractor has broadened the use of steel strappings for form fastening to include column forms, window brackets and flagstone supports.

A field representative of the Acme Steel Co., Chicago, Ill., served as advisor on the job: steel and equipment were also supplied by the company.

Rubber roller compacts cantankerous corners

Compacting work around six 171,000 bbl fuel oil tanks became a perplexing problem for the Tyrell & Davis Co. of Pasadena, Calif. when they found corner areas were inaccessible to ordinary compaction equipment.

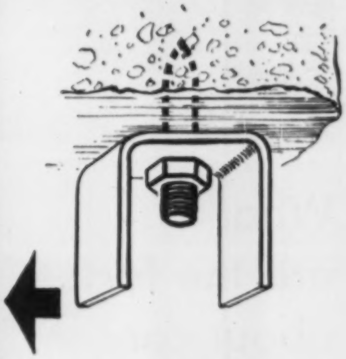
When the problem was tossed into the lap of Robert McKession, engineering consultant, he came up with a 2,700-lb rubber-tired, wheel mounted on the end of a hydraulically telescoping Gradall boom. Using this combination, the contractor was able to finish the job quickly and easily.

(*F & O continued on page 218*)

TELESCOPING BOOM powers compacting wheel.

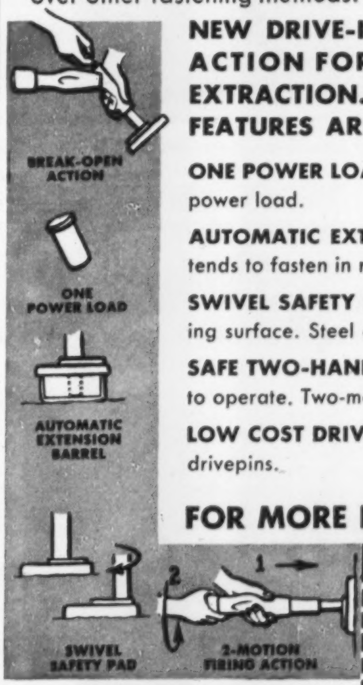
MORE FASTENINGS IN LESS TIME...

DRIVE-IT 320
WITH
BREAK-OPEN ACTION



This contractor installed metal bookshelves in the Tennessee State Archives Building with the aid of *DRIVE-IT* powder-operated fastening system. Over 4000 drivepins were driven into concrete ceilings and floors to anchor the bookshelves.

DRIVE-IT offers substantial savings in money, time, and material over other fastening methods.



NEW DRIVE-IT 320 FEATURES BREAK-OPEN ACTION FOR FAST, EASY LOADING AND EXTRACTION. OTHER JOB-PROVED DRIVE-IT FEATURES ARE:

ONE POWER LOAD. Variable penetration with one strength power load.

AUTOMATIC EXTENSION BARREL. Integral with tool. Extends to fasten in recesses.

SWIVEL SAFETY PAD. Swivels 360° to fasten near adjoining surface. Steel and tough Neoprene for protection.

SAFE TWO-HAND FIRING. Tool must be held against work to operate. Two-motion firing action for safety.

LOW COST DRIVEPINS. Prices are lower on wide range of drivepins.

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DRIVE-IT
the original
POWDER-ACTUATED TOOL

PHOTOGRAPH BY RICHARD BEATTIE

What are the facts about cancer of the lung—?

JUST 20 YEARS AGO, in 1933, cancer of the lung killed 2,252 American men. Last year, it killed some 18,500.

WHY THIS STARTLING INCREASE? Our researchers are finding the answers as rapidly as funds and facilities permit—but there isn't enough money.

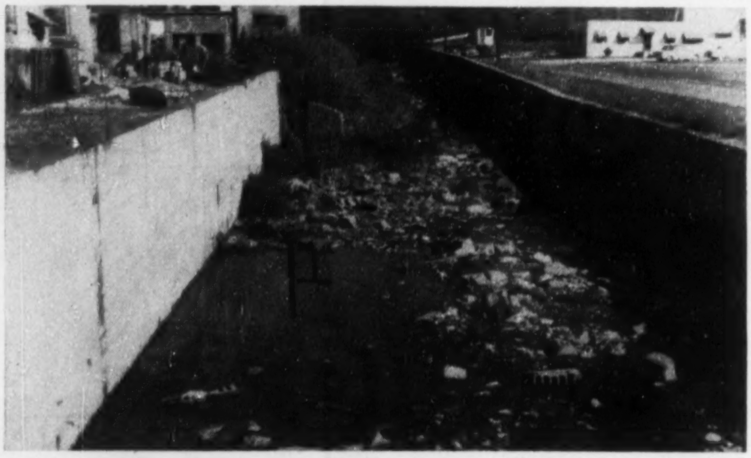
DOCTORS ESTIMATE that 50% of all men who develop lung cancer could be cured if treated in time. But we are actually saving only 5% . . . just one-tenth as many as we should.

WHY—? Many reasons. But one of the most important is not enough money . . . for mobile X-ray units, for diagnosis and treatment facilities, for training technicians and physicians.

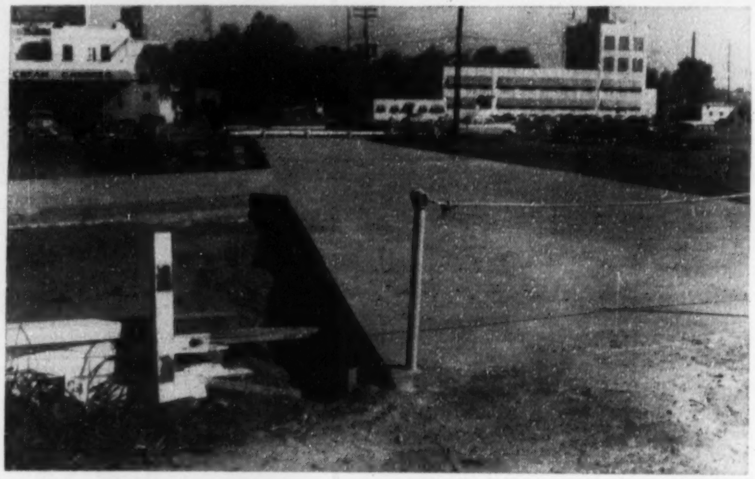
THESE ARE JUST A FEW of the reasons why *you* should contribute generously to the American Cancer Society. Won't you please do it now? *Your* donation is needed—and urgently needed—for the fight against cancer is *everybody's* fight.

Cancer
MAN'S CRUELEST ENEMY
Strike back—Give

AMERICAN CANCER SOCIETY
GENTLEMEN:
☐ Please send me free information on cancer.
☐ Enclosed is my contribution of $........ to the cancer crusade.
Name..........................
Address.........................
City............State...........
Simply address the envelope: CANCER c/o Postmaster, Name of Your Town



BEFORE cleanup this unsightly looking open stream ran through commercial property.



AFTER $7,000 was invested the land value climbed. Sanitation improved greatly.

PRESTRESSED concrete block beams were rested on 12-in. wide bond course.

Concrete cleanup

Concrete masonry and beams raise land value

Land values of the property owned by the Ernst Co. of Nashville, Tenn., were given a boost with the concealment of a necessary but ugly stream.

The project consisted of building 12-in. thick reinforced concrete masonry walls along the banks of the ditch and then enclosing much of the stream with prestressed concrete block beams.

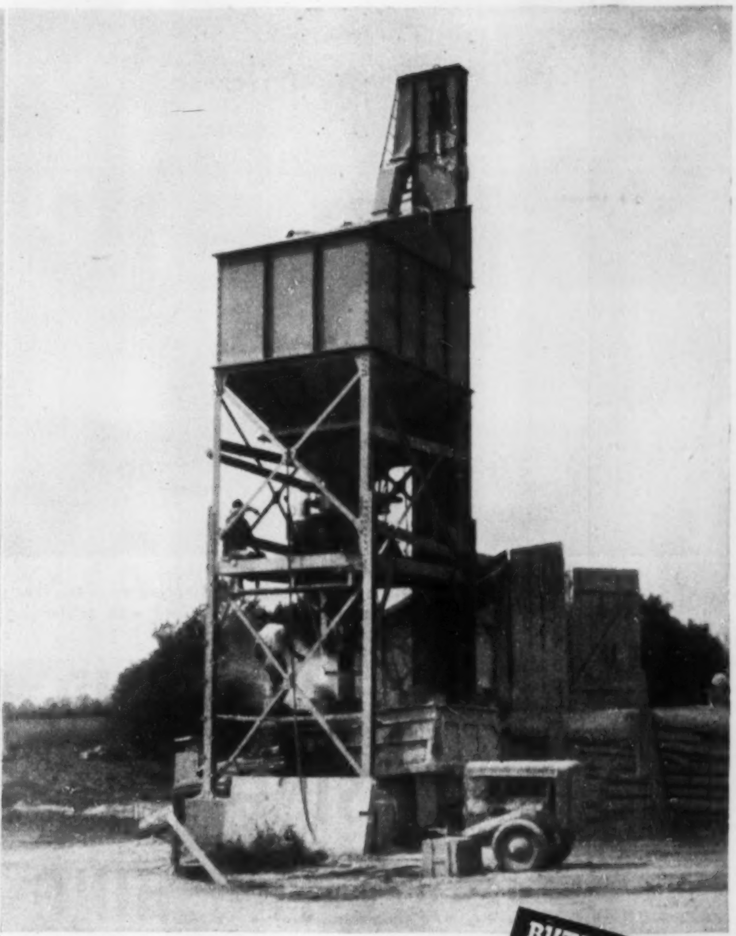
The total of the beams rested on a 12-in wide bond beam course atop the walls was 220, and after installation, a concrete wearing course was laid down.

The project took about five months for side excavation, construction, backfilling, etc., and cost approximately $7,000.

(*F & O continued on page 221*)

Built in '37

This Veteran Butler Plant Paces Today's Top Paving Production!



BUTLER Cement Batching Plant built in 1937 — still in echelon production.

IN 17 years of cement batching, during which the speed of laying a pavement has literally soared, this 1937 BUTLER Plant has met the demand every step of the way.

Now, on a 6½ mile, 4 lane, $4,000,000 Lancaster (Pa.) by-pass the veteran batched for a 34E dual drum paver in laying 122,279 square yards of concrete. The pavement was a 7-inch slab covered with a reinforcing screen and topped with 2 inches more of concrete.

The point is:

in 1937 BUTLER Engineers designed and built plants to match the 1954 demand. And in 1954 BUTLER Engineers are designing and building electronically controlled, automatic batching equipment to meet the production you'll require from now until 1971 — and beyond.

That's why it's just smart business to buy BUTLER.

BUTLER
PORTABLE BATCHING PLANTS

Have you read this recently published Bulletin on BUTLER Roadbuilders' Plants? Completely illustrated, it shows all of BUTLER standard features and profit-making accessories. BUTLER specializes in portability. Ask for Bulletin 205 to find out how. *Send a postcard today.*

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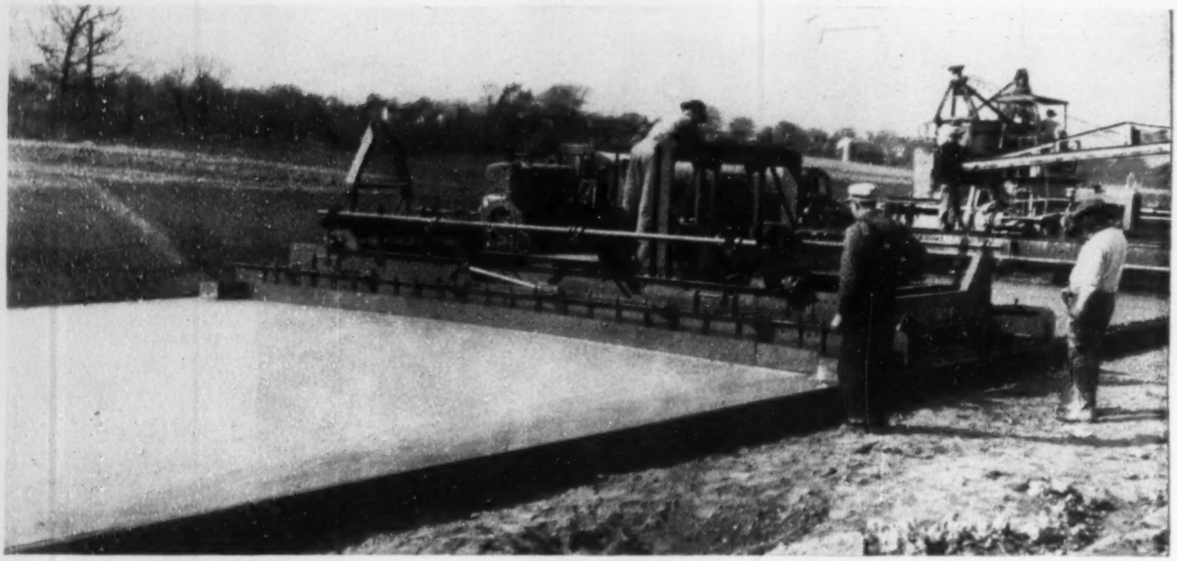


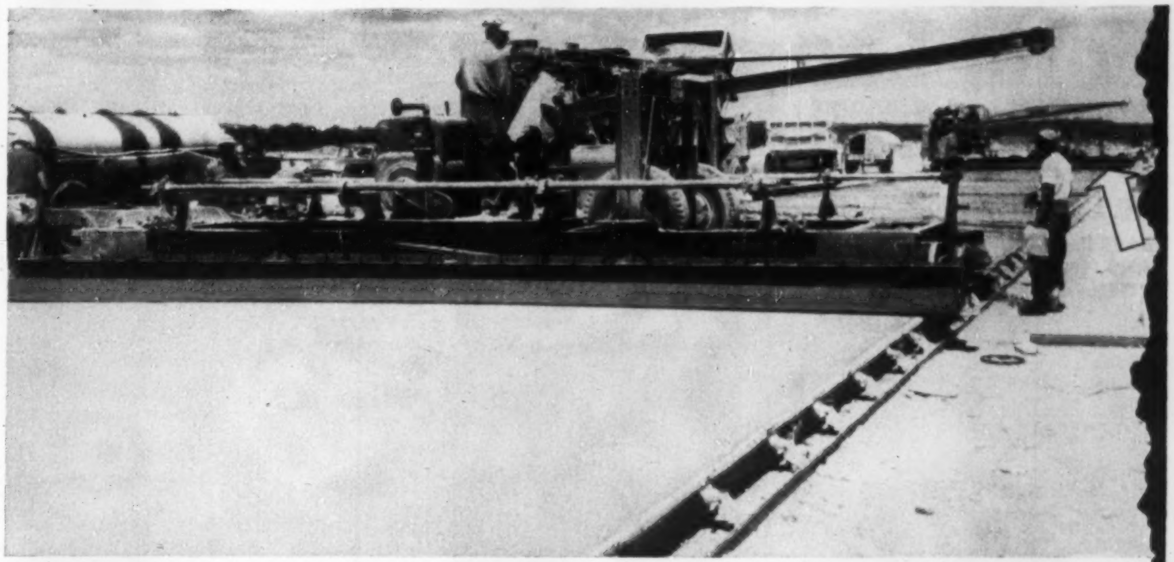
TURNPIKE: Contractor worked job with two finishing machines, then switched to single Detroit Special — which finished the work. Flex-Plane machines have been used with outstanding success on all major concrete turnpikes.

NOW—YOU CAN BID ALL JOBS WITH A SINGLE DETROIT SPECIAL PORTABLE FINISHING MACHINE

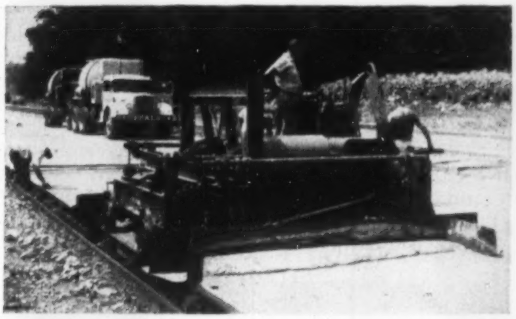
Look it over. Here's picture proof that it will do all jobs. Watch it in action and you'll agree it's the finest all-around finisher ever produced. Talk to contractors who operate these machines and you'll join the fast increasing legion of Flex-Plane customers.

Flex-Plane builds the Detroit Special in completely telescopic sizes to suit your operational requirements, but why not get all the facts. They're assembled in a new illustrated booklet available now.

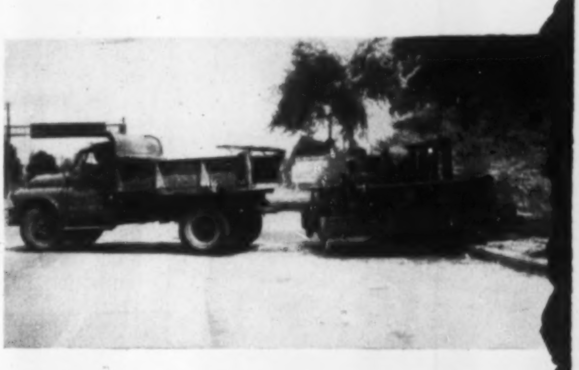
CITY STREET: A single Detroit Special replaced three finishing machines for large municipal contractor. This reduction in capital equipment was due to the machine's amazing flexibility of adjustment. Machine on left adjustable from $15\frac{1}{2}$ to 25 feet. Machine on right, worked paving widths of 22', 24' and 27' - 4", moving from two to four times a day from one section to another. Note integral curb method.



AIRPORT: Two Detroit Specials replaced spreaders on this New England airport job. Working at 25 feet the machines struck-off, spread and finished a complete $2,650,000 U. S. Navy project. Arrow indicates first machine.



THRUWAY: Eastern contractor, building many of the East's famed thru ways, finds his Detroit Special enables him to reduce his hand finishing, maintain faster production in a variety of widths.



PORTABLE: Estimate the number of times you must move your finishing equipment, whether city street or highway work, and you'll quickly see why the Detroit Special's "Five Minute Self-Portability" pays quick dividends.

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GET THE FACTS, NOW! Learn now how the Detroit Special can save you thousands of dollars on your paving this year. Write for a new 28-page booklet filled with reasons why the Detroit Special has become the nation's most popular finishing machine.

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ROAD JOINT
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Strip smooth and clean...

SAVE RUBBING AND FINISHING COSTS!

Form-Lac
For Smoother Concrete
Proven
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Product
Maxwell & Hitchcock, Inc.

STRETCH THE LIFE OF YOUR PLYWOOD FORMS... GET SMOOTHER FINISH CONCRETE WITH FORM-LAC! FORM-LAC has saved thousands and thousands of dollars for users. Most effective, easiest to apply form coating you can buy on the market today. FORM-LAC gives plywood forms a tough, durable coating . . . provides greater resistance to moisture and the alkaline and abrasive action of concrete.

GET *ALL* THE FACTS... *Send* FOR THIS NEW, FORM TREATING MANUAL WITHOUT DELAY...

MAXWELL & HITCHCOCK, INC.
191 Simpson St., N.W.
Atlanta, Georgia

Gentlemen:

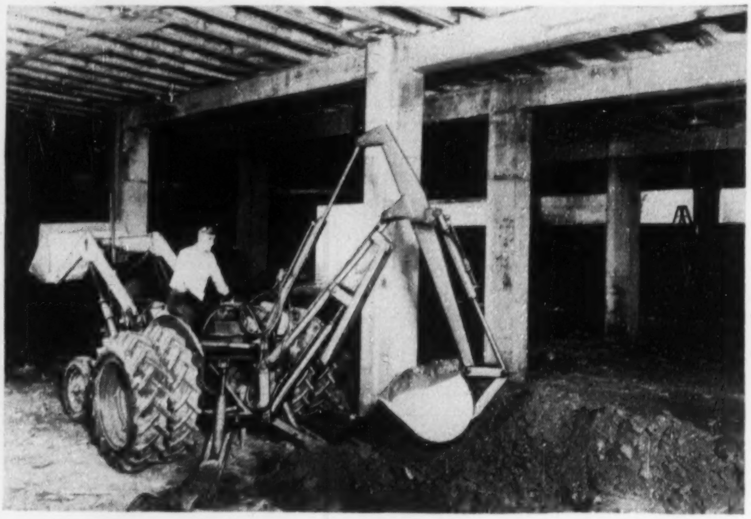
Without obligation, please send me your new **Form-Lac** "Question and Answer" manual on the treatment of plywood concrete forms.

Name ____________

Title ____________

Company ____________

Address ____________



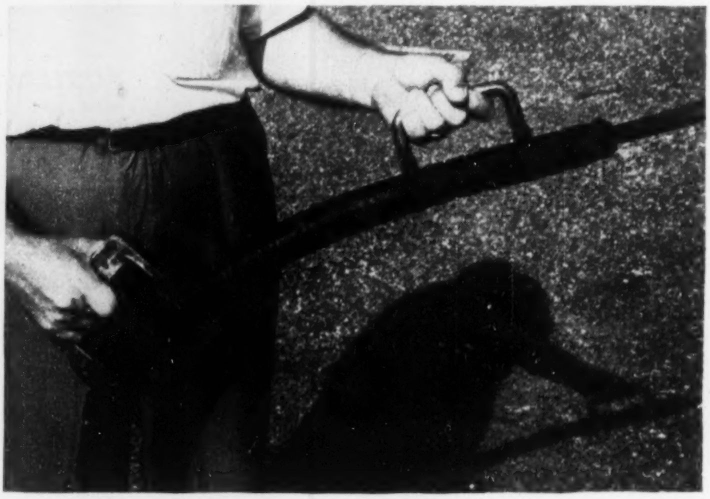
Construction gets jump on the weather

Contractors and engineers got out in front of Michigan's winter weather by leaving basement trench work for a new building to be done after concrete flooring work was completed.

The building is the 206-bed Oakland Hospital in Royal Oak, Mich. O. W. Burke Co. of Detroit, general contractor, and Allerbe & Co. of St. Paul, architect-engineer, decided to pour as much concrete as possible for the building before cold weather could bring on the usual complications and limitations. The job of digging basement trenches for sewer and electrical connections therefore was postponed.

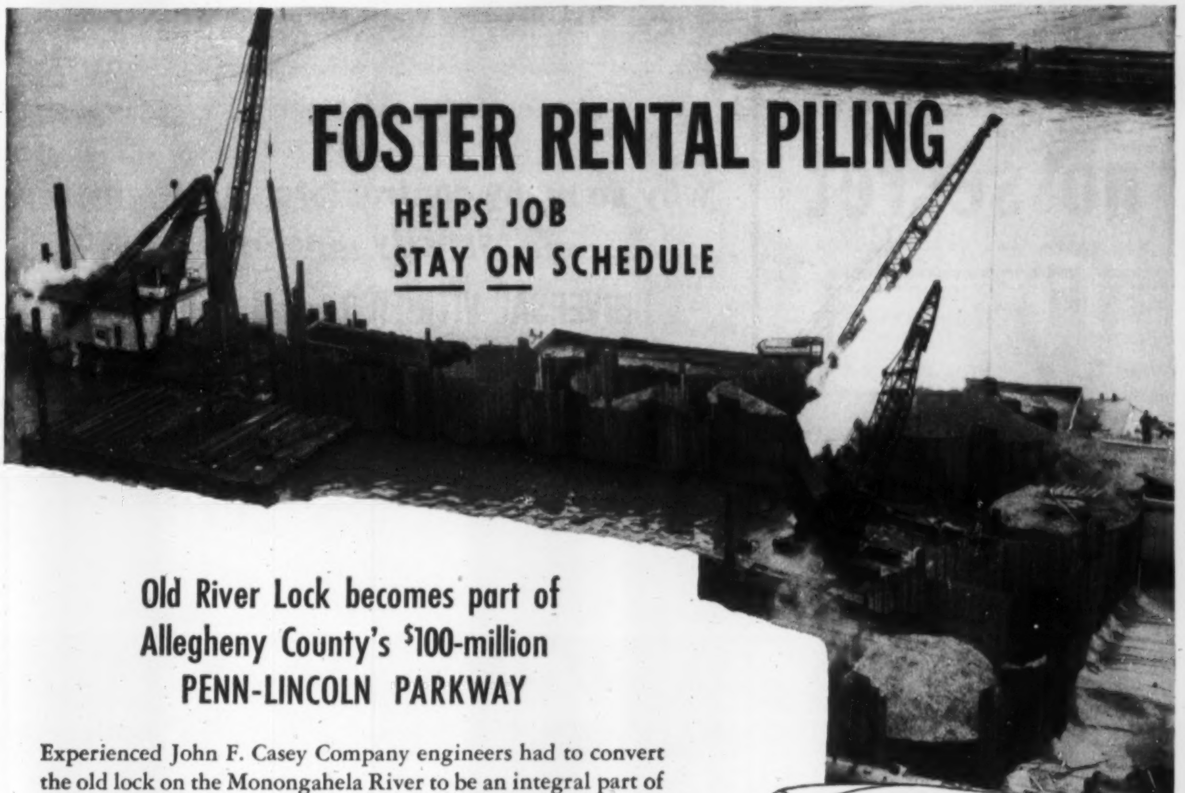
When work had progressed to a point where basement trenching operations could be begun, a small hydraulic loader-trencher was lowered through an areaway into the basement.

The pattern of trenches totaled 1,500 ft and was excavated in 30 hrs by Robert Patton, owner and operator of a Sherman Digger. He estimated that the same digging by hand would have required about 320 man-hours.



Two handles aid steam hose control

Steam cleaning operations at the DuPont Jackson Laboratory, Penns Grove, N. J., have been made easier with a job-made steam hose handle setup. The rear handle is equipped with a trigger connected to a six volt relay box. The relay activates an air solenoid valve that in turn operates a diaphragm. This allows the steam to pass through a control valve to the hose. The front handle is used to direct the steam.



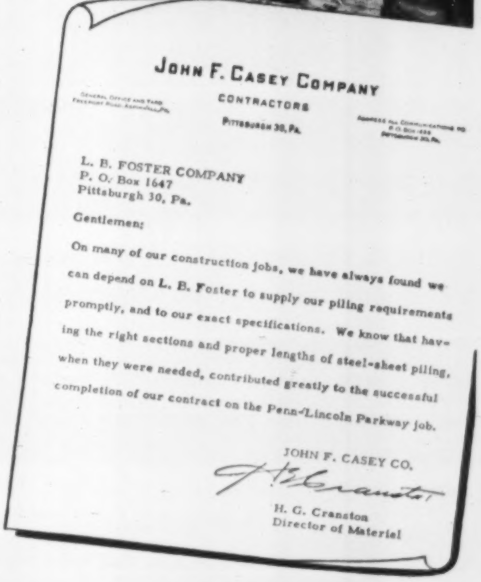
FOSTER RENTAL PILING

HELPS JOB STAY ON SCHEDULE

Old River Lock becomes part of Allegheny County's $100-million PENN-LINCOLN PARKWAY

Experienced John F. Casey Company engineers had to convert the old lock on the Monongahela River to be an integral part of the new extended river wall to relocate the existing roadway and accommodate the new Penn-Lincoln Parkway. Casey engineers drove cellular cofferdams averaging 23'9" in diameter to keep water seepage to the minimum on this tremendous engineering project. Their careful planning insured an efficient, uninterrupted work schedule in constructing the river wall, and an important part of the schedule depended on Rental steel-sheet Piling from Foster. Foster delivered ahead of schedule, in the exact sections (MP-112) and in the specified lengths.

On your next Piling job, call Foster for the exact sections, in the exact lengths . . . on the job when you need it, and at Foster's standard low rental rates that allow considerable saving.



JOHN F. CASEY COMPANY
CONTRACTORS
PITTSBURGH 30, PA.

L. B. FOSTER COMPANY
P. O. Box 1647
Pittsburgh 30, Pa.

Gentlemen:

On many of our construction jobs, we have always found we can depend on L. B. Foster to supply our piling requirements promptly, and to our exact specifications. We know that having the right sections and proper lengths of steel-sheet piling, when they were needed, contributed greatly to the successful completion of our contract on the Penn-Lincoln Parkway job.

JOHN F. CASEY CO.

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H. G. Cranston
Director of Material

NEW PILING CATALOG

Describes steel-sheet Piling Sections and construction data. Ask your nearest Foster office for Catalog EP-2.

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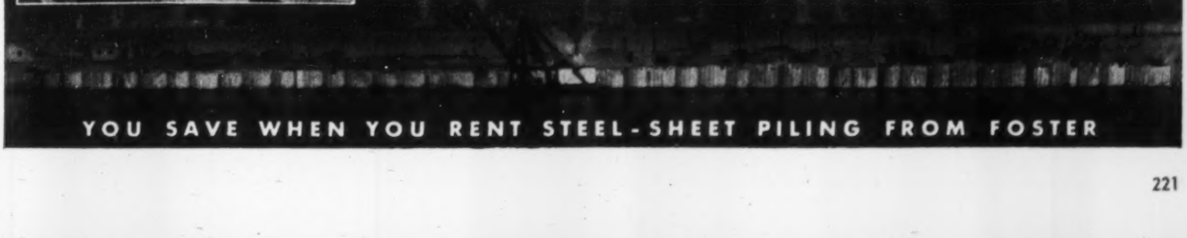
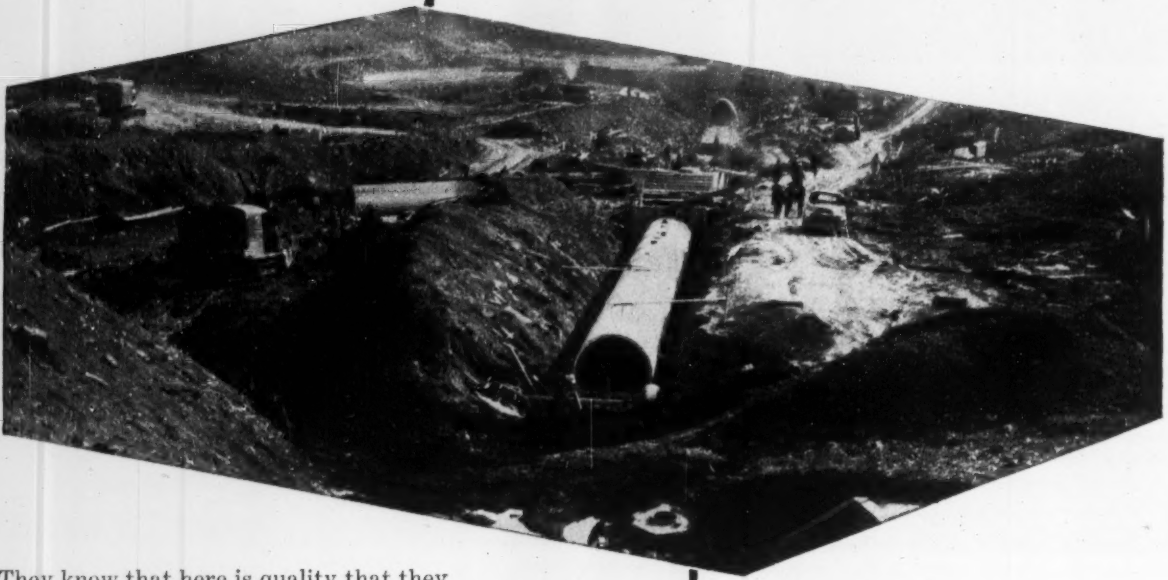


YOU SAVE WHEN YOU RENT STEEL-SHEET PILING FROM FOSTER

There's no secret

why so many contractors and engineers specify pipe by

UNIVERSAL VITRIFIED—U. S. CONCRETE



They know that here is quality that they cannot beat — uniformity that is dependable always — pricing that is always right — and completeness of line that assures them the kind and size of pipe needed.

But what's equally important — with eight great plants strategically located at vantage points in the territory — the contractors and engineers know that they will get prompt shipment.

ASHBURTON FILTRATION PLANT
84" Reinforced Concrete Pipe
Half Lined with Vitrified Plates

ENGINEEER: W. J. Strohmeyer,
City of Baltimore Water Dept. Engineer

CONSULTING ENGINEER:
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CONTRACTORS:
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Sewer Pipe (Concrete)
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Meter Boxes
Ship Lap Wall Coping
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Conduit for underground steam and insulated piping

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UNIVERSAL SEWER PIPE CORPORATION
UNITED STATES CONCRETE PIPE CO.

• **GENERAL OFFICES** • 1500 Union Commerce Building • CLEVELAND 14, OHIO

MEN AND JOBS

Gould retires from N. Y. City to join Greeley & Hansen

Richard H. Gould—quiet, unassuming inventor of sewage treatment processes credited with having saved millions of dollars in construction and operation costs—has retired as director of the division of sewage disposal, New York City Department of Public Works. He will go with the Chicago consulting firm of Greeley & Hansen, representing them in New York.

With New York City since 1928, Mr. Gould has been responsible for design of 11 modern treatment plants, part of a total capital program amounting to more than $300 million. He pioneered the development of power from sewage gas, including the first dual-fuel diesel engine. His improvements on the activated sludge process—step aeration and high rate activated sludge—have meant substantial plant-cost savings, and work recently under study in his division points to still further refinements of aeration practice and of sludge concentration and digestion. His work has been watched and adopted by sanitary engineers throughout the world.

"Another outstanding engineer is leaving city service because of inadequate salary," said Public Works Commissioner Frederick H. Zurmuhlen, getting in a plug for more "career incentive" in city service as he announced Mr. Gould's retirement.

Gould will be 65 this year. Born in Newton, Mass., in 1889, he graduated from MIT with a B.S. in Sanitary Engineering in 1911. He then went to Germany's Emscher River Valley for a year and a half of education and experience in sewage disposal work under the famed Karl Imhoff.

Back in the U.S., he served employers including Robert J. Harding, Hazen & Whipple and James H. Fuertes. During World War I he served in the U.S. Army—seven months as a pursuit pilot in France.

Since 1928, when he went to work as chief engineer on design of New York's Wards Island sewage treatment works, he has moved through a series of titles and changes in city public works organization. But since 1930 he has been responsible for design, construction and maintenance of all sewage treatment plants and interceptor sewers in the city.

Mr. Gould has been succeeded as director by William A. O'Leary, his design-bureau chief since 1948. Mr. O'Leary has been with the Department of Public Works since 1938, except for World War II Navy service as a lieutenant commander.

Consultants pick officers

Scott Turner, New York City, has been reelected president of the American Institute of Consulting Engineers. Other new officers for 1954 include: Vice-presidents—Richard E. Dougherty of New York City, and Francis S. Friel, of Albright & Friel, Inc., Philadelphia; Secretary—Leslie G. Holleran, New York City; Treasurer—George C. Diehl, New York City. Three consulting engineers (all of New York City) were elected council members for a term of three years. They are: Robert W. Abbett, of Knappen-Tippetts-Abbett-McCarthy; Richard Hazen, of Hazen & Sawyer; Carlton S. Proctor, of Moran, Proctor, Mueser & Rutledge.

Engineers Joint Council names NYU dean president

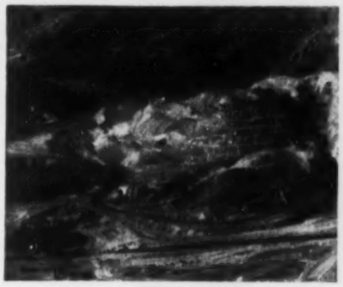
Dr. Thorndike Saville, dean of New York University's College of Engineering since 1936, has been elected president of the Engineers Joint Council for 1954. The council, representing 170,000 members of eight constituent societies, has the job of coordinating activity in the entire engineering profession.

Noting that the shortage of engineers continues to be a serious national problem, Dr. Saville says: "One of the main objectives of the council will be to associate with our member societies of all the country's engineering organizations in a unified approach to na-

(*Continued on page 224*)

what's NEW in Engineering

A triple threat fire truck to fight oil field fires is reported to have been perfected by the Seagrave Corporation of Columbus. Unlike ordinary fire-fighting apparatus, the new truck is designed to snuff out oil field and refinery fires any one of three ways; by squirting out 2800 gallons of water a minute, 1300 pounds of dry chemical compounds, or 19,000 gallons of fire-smothering "foam". In an emergency, all controls on the 20,600 pound unit can be operated by one man.

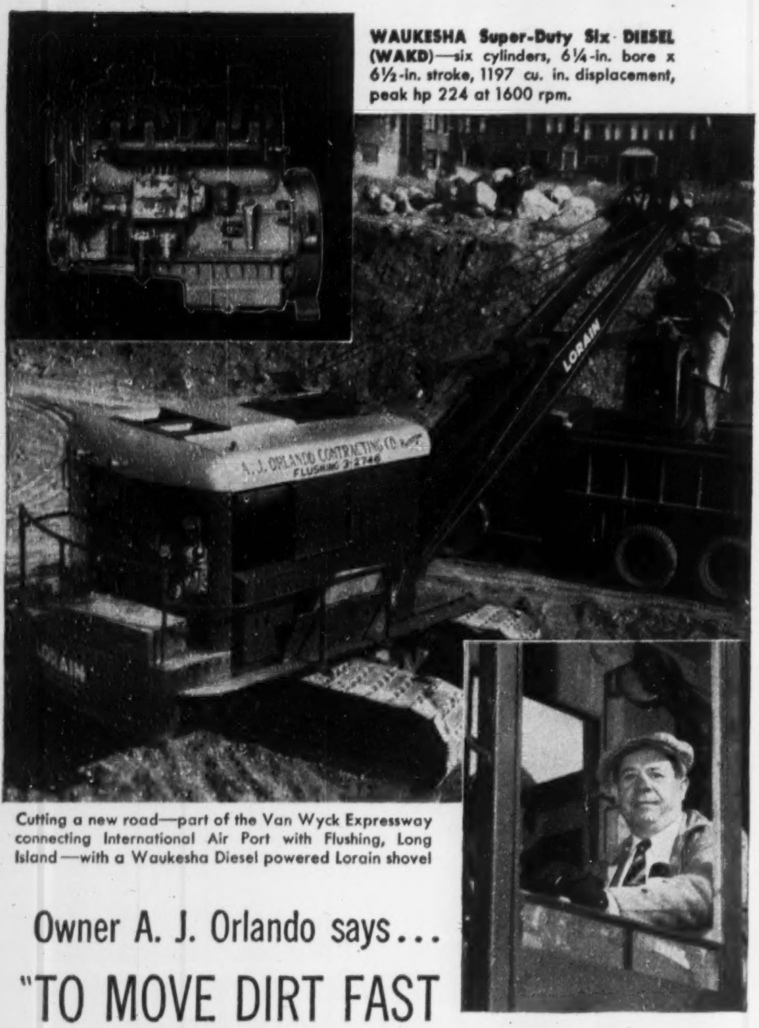


To utilize low grade ores previously stockpiled, Kaiser Engineers has designed and built a new beneficiation plant at Eagle Mountain Mine, California. The new plant will increase the iron content of the ore shipped and thus further reduce the operating costs of the West's only completely integrated steel plant, 163 miles away. Incidentally, 51 miles of this distance is over the standard gauge railroad designed by Kaiser Engineers to cross the Southern California desert and connect the mine with the tracks of the Southern Pacific.

TO BE PUBLISHED

Temperature Measurement in Engineering, described as a "how to" book for the proper design, performance, and operation of temperature measurement installation, has just been published by Wiley. The authors of the new book are H. Dean Baker, E. A. Ryder and N. H. Baker.

Kaiser Engineers has a large staff of engineering and construction experts ready to tackle your problems in all fields of design, engineering and construction. Call or write: Kaiser Engineers Division of Henry J. Kaiser Company, Kaiser Building, Oakland 12, California.



WAUKESHA Super-Duty Six DIESEL (WAKD)—six cylinders, 6¼-in. bore x 6½-in. stroke, 1197 cu. in. displacement, peak hp 224 at 1600 rpm.

Cutting a new road—part of the Van Wyck Expressway connecting International Air Port with Flushing, Long Island—with a Waukesha Diesel powered Lorain shovel

Owner A. J. Orlando says...

"TO MOVE DIRT FAST and ECONOMICALLY—I prefer **WAUKESHA DIESELS** to any others I have owned or operated"

A. J. Orlando puts on the power—digging starts! It's that quick—that smooth! It's *fast recovery* that makes the Waukesha Diesel so different. "A. J." knows the difference. So do his operators. He owns not one, but three Waukesha Diesel powered 2-yd. Lorain shovels—all working for the A. J. Orlando Contracting Co., Whiteside, L. I., New York.

Plenty of other contractor-owners, and their operators prefer Waukesha Diesels. For the same reasons. More loads per minute. Extra power in the pinches. All-around dependability. And the lively, responsive acceleration, shock-free operation, and clean burning for fuel economy that you get with the patented spherical combustion chamber of the Waukesha Diesel. Check *all* its features—get Bulletin 1415.

231

WAUKESHA MOTOR COMPANY, WAUKESHA, WIS.
New York • Tulsa • Los Angeles

tional problems having engineering aspects."

An authority on hydrology, water supply and coastal engineering, Dr. Saville has served on various boards and commissions—and as consulting engineer on projects in his field.

He was chairman of the engineering panel on future water supply for New York City; executive engineer for the water resources section of the National Resources Board; consulting engineer for the Rockefeller Foundation to the Venezuelan government; and advisor to the public works committee of the first Hoover Commission.

Careers . . .

- **Labor relations director**—Leon B. Kromer, formerly director of labor relations for Merritt-Chapman and Scott Corp., has become director of labor relations for the Albany, N. Y., Builders Exchange.

- **Power project consultant**—Franklin J. Leerburger has been named chief engineering consultant to the Power Authority of the State of New York. His job will be advising the authority on its construction program for the $3-million St. Lawrence River power project. Recently Leerburger was consultant to the Mutual Security Agency in the development of coal fields and hydro-electric power in Turkey.

- **Steel company personnel**—Truscon Steel Division of Republic Steel Corp. has announced that A. B. Greene, former Houston district sales manager, will become sales manager for reinforcing products at Youngstown, Ohio, headquarters. Wayne R. Woolley, formerly design engineer for the Chicago division of the U. S. Bureau of Public Roads, has been named highway products engineer for the firm at Youngstown, Ohio.

- **Election returns**—David B. Sloan has been elected president of Gibbs & Hill, Inc., consulting engineers, designers and constructors. Formerly executive vice-president, Sloan succeeds E. C. Johnson, resigned. Edward H. Anson has been elected senior vice-president; John B. Saxe, vice-president and chief engineer; Barclay G. Johnson, vice-president and engineering manager.

- **New commission member**—Edward W. Kilpatrick, New Jersey state highway engineer, has been made a member of the Delaware River Joint Toll Bridge Commission, succeeding Russell B. Stone.

Full Year's Service in Israel Gives Further Proof of GYRO-FLO Dependability

This Ingersoll-Rand 210 cfm GYRO-FLO compressor, shown here on a paving job in Tel-Aviv, Israel, has been in steady service for a year with no attention other than routine inspection and fueling.

Thousands of miles from the factory, this 210 cfm GYRO-FLO has required no maintenance other than on-the-job routine servicing

Wherever in the world GYRO-FLO compressors are used, the reports are pretty much the same. It's the most maintenance-free portable unit ever applied on any job.

That's because the GYRO-FLO rotary compressor is the last word in mechanical simplicity, stamina and dependability. It has no pistons, rings, rods, valves or clutches to wear out, adjust or replace. Since discharge temperatures are below 200°F, air hoses last longer, too. And by maintaining constant 100 psi pressure, the GYRO-FLO assures maximum efficiency of your air-power equipment.

GYRO-FLO portable compressors are now available in 105, 210, 315 and 600 cfm sizes, powered by GM diesel or Continental Red Seal gasoline engines. Whatever your portable air power requirements, chances are you can do the job faster and at lower over-all cost with a GYRO-FLO. Ask your Ingersoll-Rand distributor or branch office for complete information.

997-2

Use the Contractors' Combination . . . . Ingersoll-Rand

11 Broadway, New York 4, N. Y.

COMPRESSORS • ROCK DRILLS • AIR TOOLS • TURBO BLOWERS • CONDENSERS • CENTRIFUGAL PUMPS • DIESEL AND GAS ENGINES

185,000 square feet of fully usable space at a total cost of only $2.40 per square foot! The Coleman Company, Inc. of Wichita, Kansas chose Butler to solve their expansion problem—saving 47% over conventional buildings.

Build for life . . . build for less with BUTLER steel buildings

Engineered to modern management needs in a rapidly changing economy—that's why Butler steel buildings give you *more* than mere shelter and work-space. They are a *new* profit-tool for management! Butler's versatile buildings can be modified to new purposes, new installations, new plant layouts—or moved to new locations—quickly and inexpensively. They can be erected in one-half the time required for commonly used materials. Butler buildings equal or exceed conventional structures—in unobstructed clear-span interiors—in snug weather-tight protection for extremes of heat and cold—in appealing good looks, and unbeatable economy!

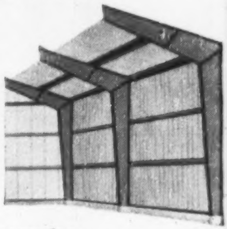
Yes, you build better *for less*. The Coleman Company economy story illustrated above is a common experience of Butler customers. Savings on the original financing—or investment of reserves, will make a real difference in the profit position of your organization from the very start. Lower maintenance costs and depreciation of Butler galvanized or aluminum sheeting will pay you an extra yearly dividend.

Butler buildings are an important part of your profit picture. Write today for full details and the name of your nearest Butler dealer.

Here is why BUTLER is a better buy

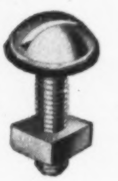
Every Foot of Floor Space is Usable

There are no interior posts or columns to waste space and create work-slowing "bottlenecks." Rigid-frame construction also shrinks maintenance costs . . . extends building life.



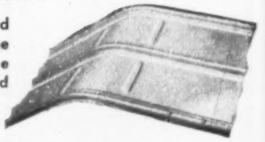
Fast Erection . . . Easy Expansion

Precision-punched and dimensioned bolt holes speed erection—simplify expansion or dismantling and moving. Galvanized bolts, with Neoprene rubber washers, lock deep-corrugated sheets firmly to the sturdy frame.



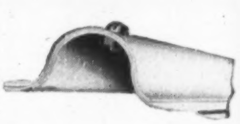
Weatherproof Protection

The one-piece, die-formed roof ridge eliminates ridge roll—helps to make the building leakproof and weather-tight.



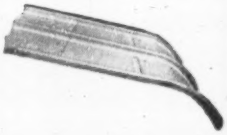
Triple-Strength Corrugated Sheets

Butler sheeting with deep-formed corrugations on 12-inch centers, is three times as strong as ordinary corrugated sheets. Overlapping corrugations bolt tightly together for maximum strength and weather protection. Your choice of steel or aluminum sheeting.



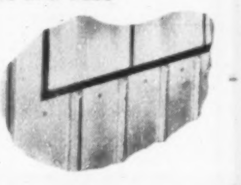
Attractive Curved Eaves

The neat, die-formed eaves—which bolt to the roof sheets—add to the appearance of Butler steel buildings . . . increase the strength of the eaves . . . help insure weather-tightness.



Weather-sealed Windows and Base

Where corrugated sheets meet windows or the foundation, they are tightly crimped for a snug fit that keeps out snow, moisture and rodents.



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Installment payments

Failure to make installment payments called for by a construction contract constitutes a breach of the contract. Upon such default, the contractor need not continue the work and may abandon the contract and seek compensation on the basis of the fair and reasonable value of the work performed.[1]

The United States Supreme Court, in an opinion in another case[2] where this issue was involved, stated: "The Circuit Court of Appeals very properly held that, in a building or construction contract like the one in question, calling for the performing of labor and furnishing of materials covering a long period of time and involving large expenditures, a stipulation for payments on account, to be made from time to time during the progress of the work, must be deemed so material that a substantial failure to pay would justify the contractor in declining to proceed. * * * As is usually the case with building contracts, it evidently was in the contemplation of the parties that the contractor could not be expected to finance the operation to completion without receiving the stipulated payments on account as the work progressed. In such cases a substantial compliance as to advance payments is a condition precedent to the contractor's obligation to proceed."

(1) White v. Livingston, 75 N.Y.S. 466, 69 App. Div. 361, affirmed 174 N. Y. 538.

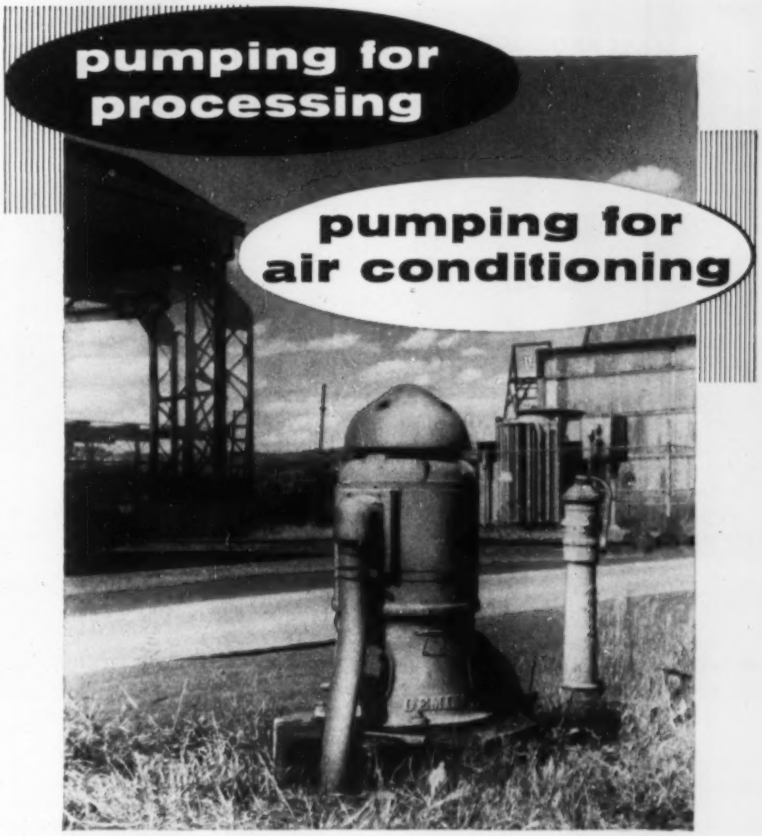
(2) Guerini Stone Co. v. P. J. Carlin Const Co., 248 U. S. 334, 63 L. Ed. 275, 285.

Agreement to subcontract

An oral agreement was entered into by two contractors to the effect that one would not submit a bid for a general contract but would give the other party a bid for supplying the steel necessary for the job and erect the same. The other contractor was to submit a bid for the general contract and in the event the general contract was awarded to it, it would subcontract the steel work to the other contractor.

The contractor who submitted the bid for the general contract was awarded the same but sublet the steel contract to a contractor other than the one to whom it had originally agreed to subcontract this part of the work. The contemplated original contractor then brought an action to recover damages for breach of contract and obtained a recovery. This judgment was reversed on appeal and a new trial ordered not because the

(*Continued on page 228*)



multi-duty **SERVICE with DEMING PUMPS**

Pumping well water at a temperature of 52° for air conditioning and then to a central reservoir for other factory uses is the multi-duty service of five Deming Vertical Turbine Pumps at a Remington-Rand plant in Elmira, N. Y. Installed in 1942, three of the pumps operate 9 hours a day and two pumps run continuously. Since 1942, only one of the five pumps has been pulled for maintenance.

Send for **BULLETIN NO. 4700-51**

Important facts about Deming Vertical Turbine Pumps are in this illustrated bulletin.

THE DEMING COMPANY
536 Broadway • Salem, Ohio, U. S. A.

Specify-**DEMING PUMPS**

subcontractor was not entitled to damages for breach of the alleged contract, but because the evidence did not justify the large judgment obtained.[1]

In another case,[2] a party about to submit a bid for a general contract, entered into a written agreement with another contractor, wherein it was provided that if the general contract was awarded to it, the other contractor would perform certain parts of the work at agreed specified prices.

After the general contractor was awarded the general contract, he called upon the other contractor to perform the part of the work called for by the subcontract. Upon his refusal to do so, he subcontracted this part of the work to another contractor at a price in excess of that called for by the original subcontract and he brought the action to recover as damages such excess cost and obtained a recovery.

---

(1) Fichter Steel Corp. v. P. T. Cox Const. Co., 42 N. Y. S. 2d 225, 266 App. Div. 347.

(2) Northwestern Eng. Co. v. Ellerman et al., 10 N. W. 2d 879.

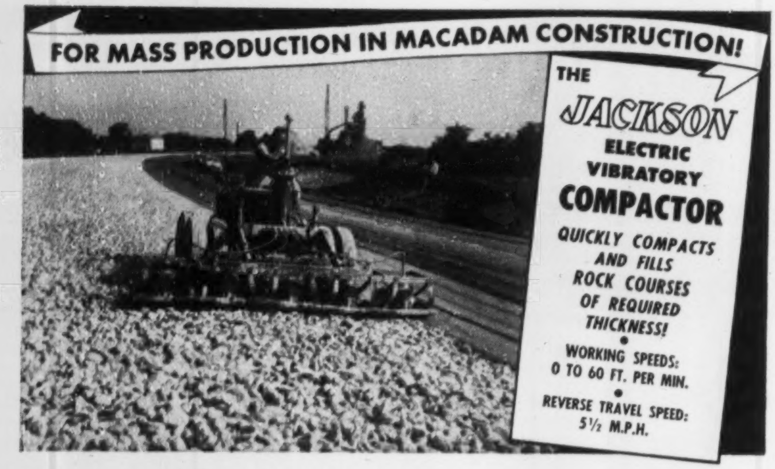
Contractor must show substantial performance

A written contract was entered into whereby the contractor was to make certain alterations and repairs to a building. The contract provided for installment payments as the work progressed. The contractor started the performance of the work and he claims that thereafter he was ejected from the building where the work was being done. The owner claimed that he stopped the work because the contractor was not performing the work as required by the contract.

The contractor brought an action to recover the difference between the fair and reasonable value of the work performed by him less the sum that had been paid to him on account. The trial court found as a fact that it was the contractor that had breached the contract and not the owner. Nevertheless the court granted the contractor a judgment for $200, which was the difference between what the contractor would have been entitled to receive under the installment provision of the contract and the amount that had already been paid to him. This judgment was reversed by the appellate court[1] on various grounds. The appellate court held that the fact that the contract set up a schedule of payments based on the progress of the work did not make the contract severable as to each payment to be made.

The appellate court in its opinion

(Continued on page 230)



FOR MASS PRODUCTION IN MACADAM CONSTRUCTION!

THE JACKSON ELECTRIC VIBRATORY COMPACTOR

QUICKLY COMPACTS AND FILLS ROCK COURSES OF REQUIRED THICKNESS!

WORKING SPEEDS: 0 TO 60 FT. PER MIN.

REVERSE TRAVEL SPEED: 5½ M.P.H.

MACADAM The JACKSON — in one pass — will sufficiently compact 12 inches of rock to support smooth rollers. In four passes, the JACKSON keys and compacts to final density. It takes just two passes for the JACKSON to completely fill voids from top to bottom of the course, when enough dry fines are spread on top in one application.

IN GRAVEL SUB-BASES (Blanket Course) 7″ thick, at optimum moisture, the JACKSON in one pass has obtained densities exceeding 100% Standard Proctor. Vibratory frequency may be varied to suit conditions.

FLEXIBLE The JACKSON is available in a standard width of 13′, 3″. Units may be subtracted on the job to meet conditions requiring narrower widths. The 26″ units can be detached and fitted with handles, providing self-propelled compactors for restricted areas, pavement patching, paving drives, compaction of granular soils in trenches, etc.

WIDENING STRIP COMPACTED IN ONE PASS With simple equipment available, compactors may be assembled in tandem, 3 deep and in single or double row, and towed at the side of the tractor to give complete compaction of widening strip in one pass in all granular materials used for flexible base-course widening. Compactor bases of 12″ width and up may be substituted for the standard 26″ bases to fit any widening requirement.

See YOUR JACKSON DISTRIBUTOR OR WRITE to us for details of this extremely versatile, multi-purpose, money-making equipment.

JACKSON VIBRATORS INC.
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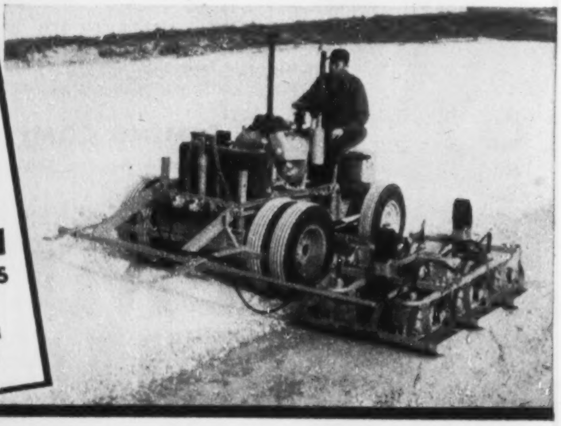
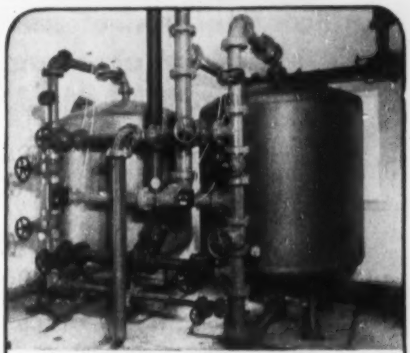


How Martinsville gets iron-free, soft water

Martinsville, Illinois Municipal Water Plant. Constructed in 1950.



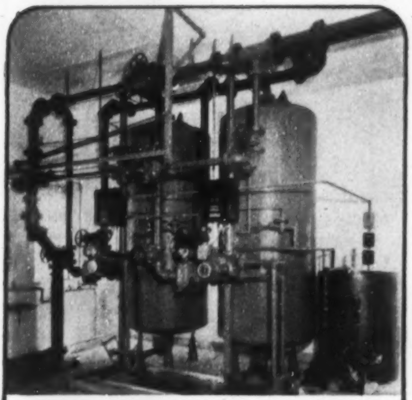
Compact Permutit pressure filters have a 150 gpm capacity...remove iron oxidized in coke-tray aerator, reduce turbidity.

MARTINSVILLE'S untreated well water was very hard . . . an extremely wasteful nuisance!

Its 269 ppm of total hardness ruinously scaled pipes and water heaters. And further annoyed citizens by wasting soap, leaving unsightly rings around bathtubs, sticky curd on dishes and laundry. Iron of 2 ppm—which gave the water an unpleasant metallic taste—caused objectionable stains on plumbing fixtures and laundered fabrics.

These troubles were ended when Martinsville installed the Permutit equipment shown. On a recent check, we asked for the operator's opinion of our equipment.

Mr. O. Wiser—who is in charge of the Martinsville Municipal Water Plant—reports: "The Permutit equipment is very good . . . has worked very well with very little maintenance."



Permutit softeners remove hardness, further reduce iron to 0.02 ppm! Automatic regeneration saves time . . . provides constant supply of softened water.

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WATER CONDITIONING HEADQUARTERS FOR OVER 40 YEARS

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The permanence of steel — in a roof that *goes up fast!*

Time is money on every building job! Milcor Steel Roof Deck gets operations under cover fast at low labor costs, gives ideal base for permanent roofs.

Milcor Roof Deck offers cost-cutting advantages you can't afford to overlook:

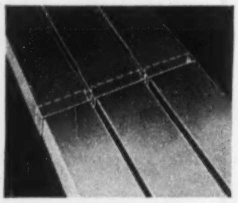
1. It can be erected anytime — in any weather a man can work.
2. It is light in weight — finished roof requires less costly supporting structures.
3. It is versatile — can be used for flat, pitched, or curved roofs . . . sidewalks and partitions . . . or as permanent steel forms for concrete.

Milcor Steel Roof Deck provides additional advantages, also: High strength-to-weight ratio. Fire resistance. Low maintenance cost.

There are many durable, low-cost Milcor Roof Deck installations now in service throughout the country — on auditoriums, field houses, factories, office buildings, hotels, apartment houses, hospitals, and schools.

For help in using Milcor Steel Roof Deck efficiently, see the Milcor Manual. Write for your copy. And — call on our engineering service for assistance on your special problems.

Milcor Steel Roof Deck is quickly attached to any structural member by welding. Clips can be furnished for anchoring the deck, when welding facilities are not available or if purlins are wood.



Unique design permits sections to be nested and lapped quickly and easily. Plates interlock firmly, providing an unbroken roof surface that is adaptable to any degree of insulation.

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stated: "The general rule is that one who seeks to recover on a contract must show substantial performance on his part, and this rule applies to a 'building contract' as to any other. But slight omissions and inadvertences should be disregarded. Where there has been an honest effort by the contractor to perform, and not a willful omission, substantial performance is all that is required."[2]

The appellate court, in its opinion, also pointed out and referred to numerous cases[3] where courts have modified the severity of this rule and permitted defaulting contractors who have contributed substantial value to the other party's property to recover the value of the work done and materials furnished on the basis of fair and reasonable value.

(1) Kirkland v. Archbold, 113 N. E. 2d 496, Court of Appeals of Ohio, Feb. 2, 1953.
(2) Ashley v. Henahan, 56 Ohio St. 559, 47 N. E. 573.
(3) Britton v. Turner, 6 N. H. 481, 26 Am. Dec. 713; Williston on Contracts, vol. 5, p. 4123, par. 1475.

Contracts with counties

"A contract, to be binding upon a municipal corporation, must be executed by the department, board, committee, council, officer, or agent vested by law with power to make it. A county is governed by its board of county commissioners. No individual commissioner has the power to bind the county."[1]

(1) Kerr v. King County, 250 P. 2d 398, Supreme Court of Washington, July 8, 1953.

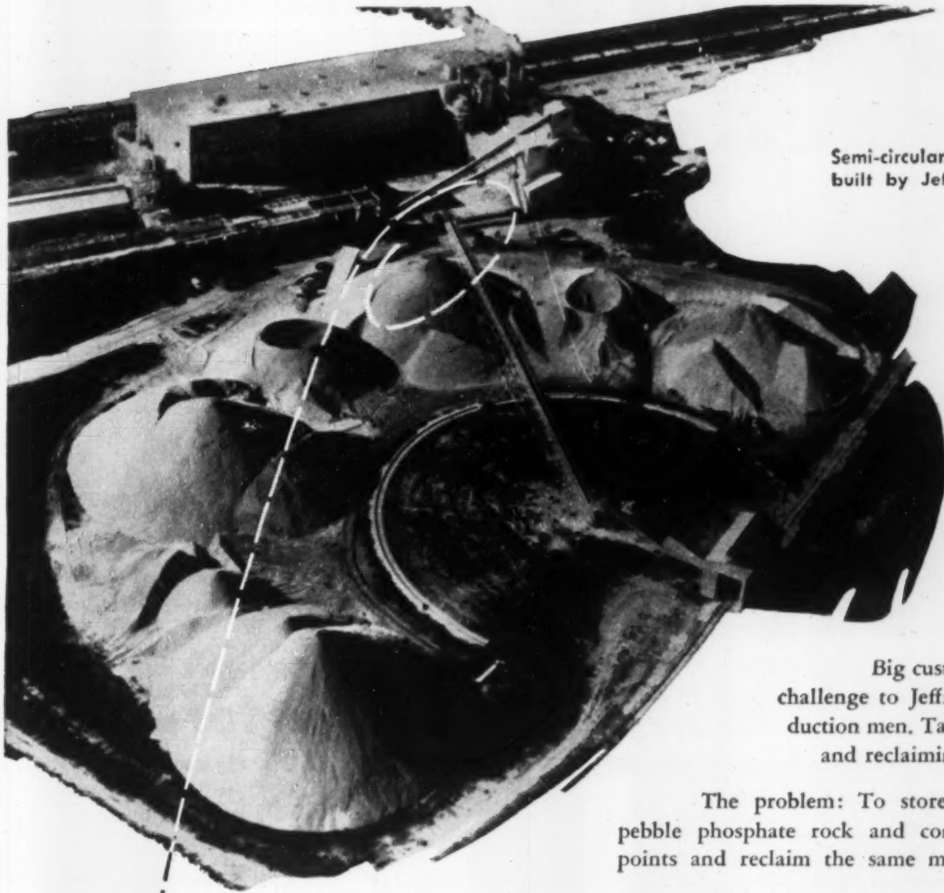
Substantial performance

"In the case of substantial but defective performance, where the contractor sues for the contract price and the owner defends by way of recoupment, the owner, upon proof of defective performance, is entitled to have the contractor's recovery reduced by the amount that would reasonably be required to remedy the defects and make the structure conform to the plans and specifications. Spink v. Mueller, 77 Mo. App. 85; Walter v. Huggins, 164 Mo. App. 69, 148 S.W. 148.

"Of course, the owner, in making his repairs, is not permitted to charge the contractor with the cost of materials more expensive, or have the building placed in a better condition than what was called for in the contract between them."[1]

(1) Talbot-Quevereaux Const. Co. v. Tandy, 260 S. W. 2d 314, St. Louis Court of Appeals, July 14, 1953

(These summaries of court decisions are prepared by I. Vernon Werbin, New York attorney and civil engineer.)



Semi-circular storage piles built by Jeffrey Stacker.

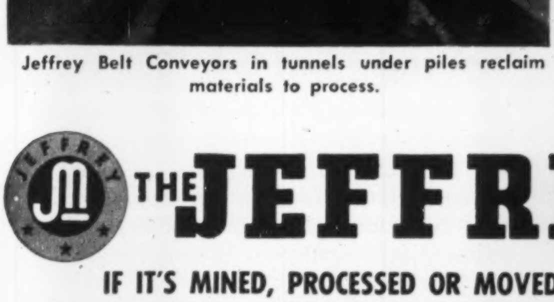
Big custom jobs are a constant challenge to Jeffrey engineers and production men. Take this modern storage and reclaiming system for instance:

The problem: To store 1" dia. and smaller pebble phosphate rock and concentrates at different points and reclaim the same material for processing.

from top to bottom ... it's JEFFREY

The solution: Material is dumped from railroad cars into track hoppers over two Jeffrey-Traylor feeders . . . moves on Jeffrey Belt Conveyor — at 800 T.P.H. — to track-mounted Jeffrey Stacker which turns on a 270′ radius to build 80-foot-high semi-circular piles of approximately 320,000-ton capacity. A series of valves beneath the piles discharge onto a traveling hopper which feeds two Reclaiming Belts at 336 T.P.H. each for processing. Rock can be removed at controlled rate from any point in pile or several points at once.

The entire installation is built to withstand hurricane winds . . . to operate efficiently at low cost . . . to meet the rigid engineering standards of Jeffrey and its client. Write for Catalog 852.



Jeffrey Belt Conveyors in tunnels under piles reclaim materials to process.

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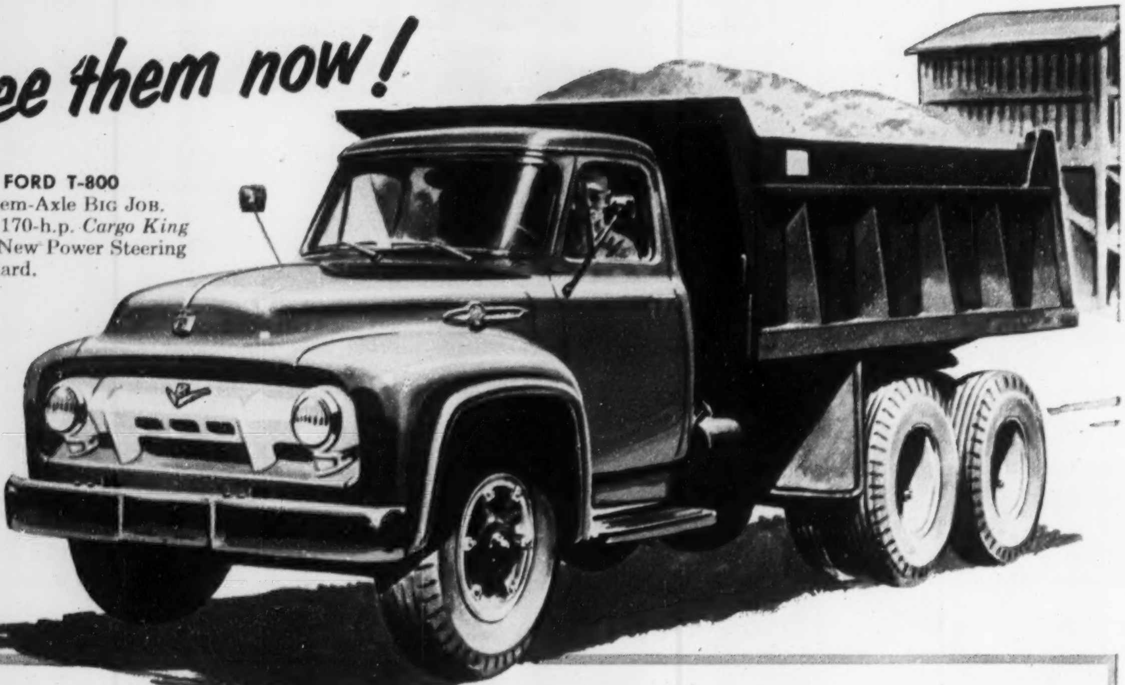
PLANTS IN CANADA, ENGLAND, SOUTH AFRICA

IF IT'S MINED, PROCESSED OR MOVED

. . . IT'S A JOB FOR JEFFREY!


See them now!

NEW FORD T-800
Tandem-Axle BIG JOB.
New 170-h.p. *Cargo King*
V-8. New Power Steering
standard.

New FORD TRUCKS for '54

featuring TRIPLE ECONOMY

Big new savings in the 3 most important truck saving areas

1. NEW Gas-Saving, Low-FRICTION, Overhead-Valve, High-Compression, Deep-Block Engines in all Models!

Now, you get a gas-saving LOW-FRICTION engine in *any* Ford Truck you choose—from 115- to 170-h.p.! New short-stroke design cuts internal friction loss up to 33%, liberates up to 23% more *usable* power.

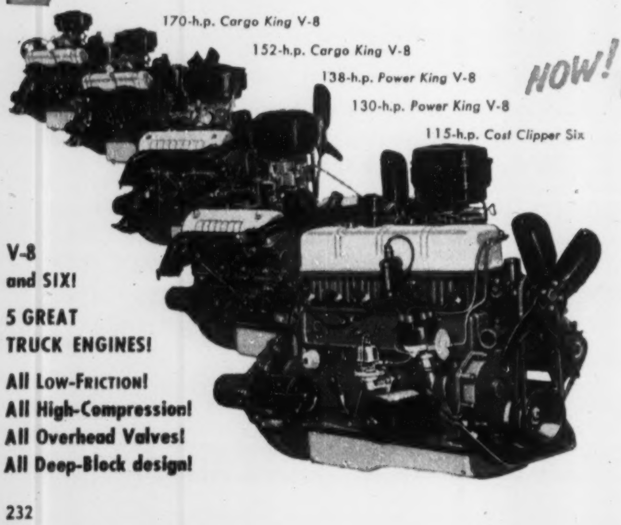
2. NEW Driverized Cabs! NEW Power Steering! NEW Power Brakes! Fully Automatic Fordomatic Drive!

Ford's 3-man Driverized Cabs cut fatigue! New *Master-Guide Power Steering* standard on T-800 Series, optional on most other BIG JOBS, Power Braking* for ½-ton, Fordomatic* for all light duty models!

3. NEW Money-Saving Capacities! Over 220 Models! New 6-wheelers! The one right truck for your job!

Ford's expanded new truck lines include brand-new Ford Tandem-Axle BIG JOBS, up to 60,000 lbs. G.C.W., and two more giant new Ford Cab Forward BIG JOBS rated up to 55,000-lbs. G.C.W.!

**Available at extra cost.*



V-8 and SIX!

5 GREAT TRUCK ENGINES!

All Low-FRICTION!
All High-Compression!
All Overhead Valves!
All Deep-Block design!

NOW! Mightiest concentration of power per cubic inch ever built into any truck engine line! Only FORD has it!

For the power they develop, Ford's new truck engines have *less cubic inch displacement* than any other truck engine line. The Ford 317 cu. in. *Cargo King* V-8 develops its 170-h.p. from as much as 96 cubic inches less displacement. Smaller-displacement engines normally need less gas! That's why Ford *concentrated power* is a big factor in new Ford Truck *TRIPLE ECONOMY!*

BOOKS

Brick construction

Reinforced Brick Masonry and Lateral Force Design—by Harry C. Plummer and John H. Blume. 271 pp. Structural Clay Products Institute, 1520 18th St., N. W., Washington 6, D. C. $4.95.

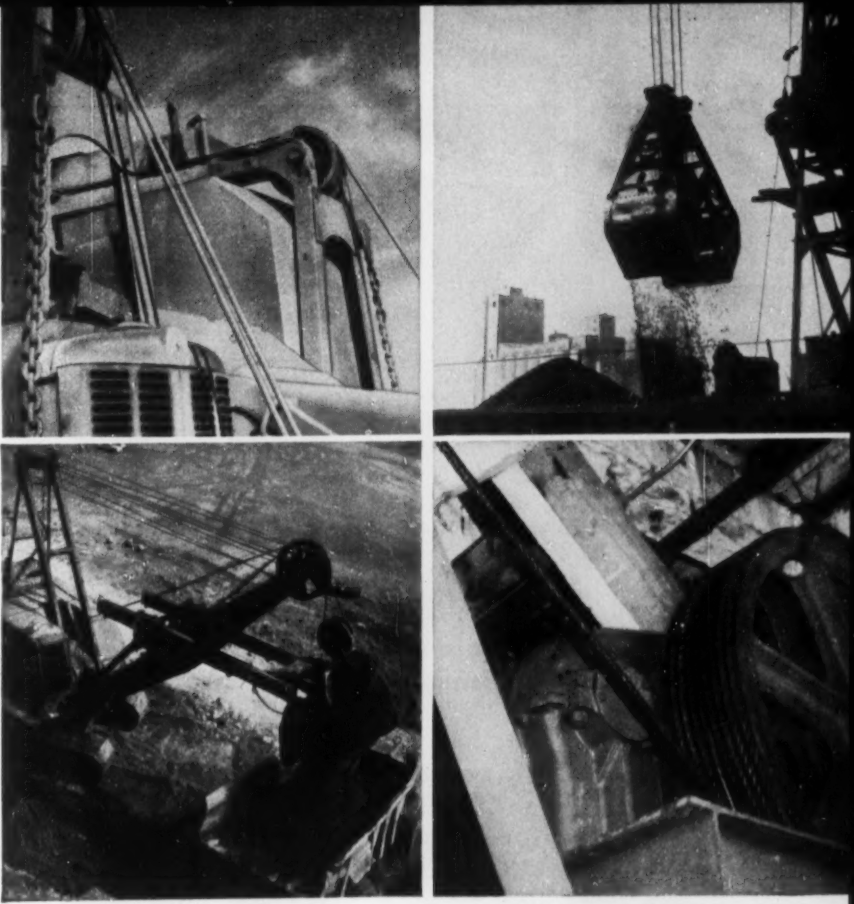
Like concrete, brick masonry can be reinforced with steel bars to resist bending stresses. In fact, design principles and formulas for both materials are the same. However, since reinforced-concrete structures are monolithic, whereas brick masonry is composed of relatively small units held together by mortar, there are important differences in the two types of reinforced construction. These differences make necessary a compilation of data on reinforced brick to supplement what is known about reinforced concrete and unreinforced brick.

Such a compilation is incorporated in the new handbook published by the Structural Clay Products Institute, national association of brick and tile manufacturers. In eight chapters it provides data on the performance of masonry, both reinforced and unreinforced. It also recommends design and construction procedures based upon these data, and reviews currently accepted design criteria, particularly those relating to lateral forces from wind, earthquake or blast. In an appendix, design formulas are applied to specific problems and design tables are presented.

Miscellaneous notes

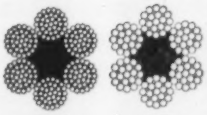
- **Bridge design standards approved** by the Bureau of Public Roads are contained in a large pamphlet recently issued by the bureau under the title "Standard Plans for Highway Bridge Superstructures". Copies may be obtained from the Superintendent of Documents, Washington 25, D. C. for $1. Intended to assist smaller highway departments with limited engineering staffs, the plans give details for steel I-beams; riveted deck plate girders; reinforced concrete slabs, T-beams and box girders; and prestressed concrete girders. Spans for simply supported structures range from 20 to 140 ft. Roadway widths included are 24 ft and 28 ft, the former designed to carry H15-44 loading and the latter, H20-S16-44. Designs are in accordance with "Standard Specifications for Highway Bridges," of the American Association of State

(Continued on page 234)



WHEN WIRE ROPE requires extra flexibility and must also lift or pull heavy loads, an unusually pliable, strong rope is needed. Rope jobs like paver skip hoists, overhead cranes, large shovel and dragline hoists, and sawmill carriages demand these qualities. That's where the use of 6 x 37 Red-Strand wire rope saves time and money.

Where will 6 x 37 Red-Strand improve your wire rope service?



Look at a cross section of 6 x 37 wire rope. You see three rings of small, uniformly sized wires in each strand. This differs from a rope construction like 6 x 19, which contains fewer and larger wires.

The *smaller size* wires make 6 x 37 more *flexible*. The *larger number* of wires maintains rope *strength*.

Would this combination improve your wire rope service? Would it solve a problem for you? Leschen's higher-than-rated quality is also providing longer-than-expected service to heavy industry everywhere.

Check with your Leschen man. He can help you.

Leschen's 64-page Wire Rope Handbook tells you all about 6 x 37 and other Red-Strand wire rope constructions. Ask or send for your free copy.

LESCHEN WIRE ROPE DIVISION
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St. Louis 12, Missouri

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HERCULES Red-Strand
WIRE ROPE

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look before you lean

Transcona Elevator, Canadian Pacific Railway, Winnepeg, Canada, which tipped 27°—righted by the Foundation Company Ltd. of Canada.

An elevator tips—a bridge sags—a building settles—a dam goes out—costly and serious mistakes in construction work. That's why it pays to make test borings before designing foundations. And, when you investigate subsoil conditions, you want the best—ACKER! For, Acker makes a complete line of low-cost, easy-to-operate soil sampling equipment—from hand to power driven tools.

Remember, too, Acker's 33 years of experience in designing and building soil sampling and core drilling equipment ONLY, is your guarantee of dependable, satisfactory operation.

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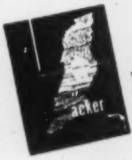


Free!

Write today for this complete, illustrated collection of information about soil sampling. Ask for Bulletin 25, ENR.

Highway Officials. These standard plans supersede those published about twenty years ago and which are now obsolete because roadway widths, unit stresses and vehicle loadings have been increased and material specifications have changed.

- **Bridge engineers** will find valuable analyses of vehicle loads in three bulletins published by the Texas Engineering Experiment Station, College Station, Tex. Authored by H. K. Stephenson and Kriss Cloninger, Jr., Bulletin 127 presents a method for converting heavy motor vehicle loads into equivalent design loads on the basis of maximum bending moments; Bulletin 131, a method for conversion on the basis of maximum shears; and Bulletin 132, a method for calculating stress-producing effects of equivalent design loads. The first two bulletins also include the results of studies of frequencies of occurrence of vehicle weights on bridges of various spans.

- **A pool of translations** from foreign technical journals, other than Russian, has been formed by the Special Libraries Association in the John Crerar Library in Chicago. Translations of Russian articles already are being assembled by the National Science Foundation in Washington.

Now deposited in the library are 1,300 translations, a list of which will soon be available for distribution. Contributions of other translations are sought, also loans for purposes of microfilming.

Arrangements are being made for publication of lists of future contributions in journals in the field of each major classification, which will permit photoprint or microfilm copies to be ordered.

Additional information concerning the pool may be obtained from the S.L.A. Translations Pool, John Crerar Library, 86 East Randolph St., Chicago 1, Ill.

New engineering books

THEORY AND PRACTICE OF STRUCTURAL DESIGN APPLIED TO REINFORCED CONCRETE—By B. Eriksen, 402 pp. Concrete Publications Limited, 14 Dartmouth St., London S.W. 1, England. $5.50

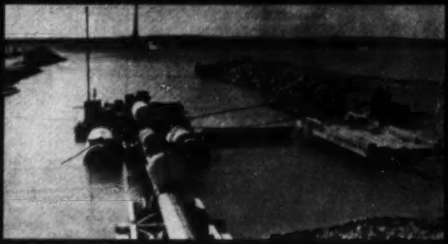
THE WORLD'S GREAT BRIDGES—By H. Shirley Smith. 180 pp. Phoenix House, 38 William IV St., Charing Cross, London 15s (Obtainable through Stechart-Hafner Inc., 31 East 10th St., New York 3, N. Y.)

(*Continued on page 237*)

YOUR CONFIDENCE IS JUSTIFIED WHERE THIS FLAG FLIES

Latest Construction "Firsts" Flying the Black Horse Flag—

"DEEP INCH" UNDER MACKINAC STRAITS



FIRST underwater pipelines ever laid by the "pull" method at such depths (243 feet) and length (4 miles). A project by M-C & S that made pipeline history.

"FLOAT IN PLACE" BRIDGE

FIRST major bridge ever built almost entirely ashore by pre-cast methods was constructed by M-C & S across 2-mile-wide Bay St. Louis, Mississippi, in record time . . . 122-ton sections of reinforced concrete roadway slab, along with piling, were floated into position for placement.

PAPER MILL FOR ISRAEL

FIRST of its kind in the Middle East, designed, engineered, and constructed by M-C & S. It will produce some 25,000 tons of paper annually, meeting almost all of Israel's needs.

"PONTOON-TYPE" BRIDGE PIERS

FIRST buoyant foundations ever used in bridge construction are part of M-C & S work on the New York State Thruway crossing over Hudson — eight giant boxes of reinforced concrete, largest weighing 16,000 tons and half the size of a city block, were built ashore then towed to site.

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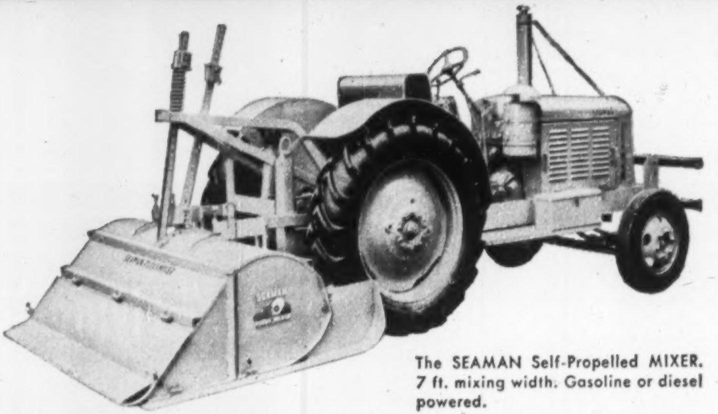
the SEAMAN MIXER

STABILIZES Base and Sub-Base Movement

. . . Saves Maintenance or Costly Reconstruction



The SEAMAN Self-Propelled MIXER. 7 ft. mixing width. Gasoline or diesel powered.

The most usual causes of base course and surface failures are weak spots in the subgrade. These can readily be prevented with a low cost stabilization of the sub-base soils. This process provides:

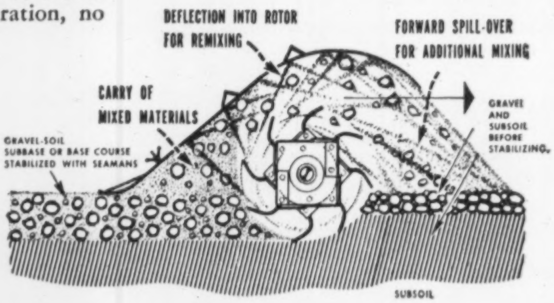
1. The elimination of coarse and fine pockets of soils.
2. An even "blending out" of wet and dry spots.
3. An increase in the uniformity of load bearing value throughout all the subgrade.

If aggregates or binders are also mixed-in, the stability is greatly improved. In either case the subgrade materials are mixed, blended and mechanically stabilized for maximum support of the base.

For maximum benefit, the aggregates *of all sizes* of the base course must be mixed, blended and interlocked. Thus the finer sizes act as a soil-mortar to unite the mixture into a solid mass. No separation, no cracking, no faulting.

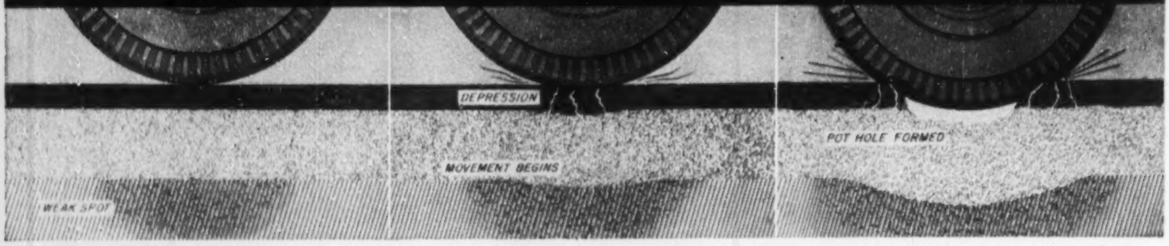
This mechanical stabilization is economically accomplished with the SEAMAN PULVI-MIXER.

Moreover, this processing also *stabilizes movement of the base and sub-base.* If weather action occurs in the sub-base, the movement it causes is wholly uniform and the base course flexes with it.


DEFLECTION INTO ROTOR FOR REMIXING
FORWARD SPILL-OVER FOR ADDITIONAL MIXING
CARRY OF MIXED MATERIALS
GRAVEL-SOIL SUBBASE OR BASE COURSE STABILIZED WITH SEAMANS
GRAVEL AND SUBSOIL BEFORE STABILIZING.
SUBSOIL

A 12-page Bulletin describing the Self-Propelled TRAV-L-PLANT and the Self-Propelled MIXER is yours FREE on request. It also shows how gravel segregation occurs and how it may be corrected. Ask for Bulletin TPS. Send a postcard today.

PREVENT THIS BY STABILIZING THE SUB-BASE


WEAK SPOT
DEPRESSION
MOVEMENT BEGINS
POT HOLE FORMED

Moisture has entered the unstabilized sub-base causing a weak spot. This would not occur if sub-base had been stabilized to uniformity and high density.

The expansion through freezing or the breakdown of the sub-base through the disintegrating effect of moisture is reflected in a localized movement of the materials above in the base.

Complete breakdown of the base course above the sub-base failure has started a chain reaction as more moisture will permeate the fault and establish repeated breakdown cycles along the width and length of the pavement.

SEAMAN MOTORS, INC. 281 N. 25th STREET MILWAUKEE 3, WISCONSIN

Beam Formulas—By A. Kleinlogel. Translated, enlarged and adapted by Harold G. Lorsch. 143 pp. Frederick Ungar Publishing Co., 105 East 24th St., New York 10, N. Y. $5.50

Applied Thermodynamics—By A. C. Walshaw. 612 pp. Blackie & Son, London and Glasgow, 40s (Obtainable through Stechart-Hafner Inc., 31 East 10th Street, New York 3, N. Y.)

Concrete Engineers' Handbook—257 pp. The Concrete Association of India, 1 Queen's Road, Bombay, India. Rs. 5/8

Engineering Thermodynamics — By Byron E. Short, Harry L. Kent, Burnett F. Treat. 467 pp. Harper & Brothers, 49 East 33rd St., New York 16, N. Y. $6.00

Earth Pressure Calculations—By J. Brinch Hansen. 271 pp. The Institute of Danish Civil Engineers, Copenhagen, Denmark. 40 krone

Reports and pamphlets

Calcium Chloride for Ice Control, with Reference Data—Calcium Chloride Institute, 909 Ring Building, Washington 6, D. C.

Calcium Chloride for Stabilization of Bases and Wearing Courses—Calcium Chloride Institute, 909 Ring Building, Washington 6, D. C.

Highway Maintenance with Calcium Chloride—Solvay Process Division, Allied Chemical & Dye Corporation, 61 Broadway, New York 6, N. Y.

Rubber in Bituminous Pavements—Technical Bulletin No. 194. American Road Builders' Association, World Center Building, Washington 6, D. C.

Highway Construction: Federal-State Relations—Construction and Civic Development Department, Chamber of Commerce of the United States, Washington 6, D. C.

Digest of Professional Engineers' Income and Salary Survey—National Society of Professional Engineers, 1121 Fifteenth Street, N. W., Washington 5, D. C. 50¢.

Least-Weight Proportions of Bridge Trusses—Bulletin Series No. 417, University of Illinois Engineering Experiment Station, Urbana, Ill., 50¢.

The Corrosion of Copper Tube Used in Soil-Stack Installations—Bulletin Series No. 419, University of Illinois Engineering Experiment Station, Urbana, Ill. 75¢.

State Traffic Safety: Its Organization, Administration and Programming—The Eno Foundation for Highway Traffic Control, Saugatuck, Conn.

ALL DOOR and 352 yards WIDE

engineered and built for
LOCKHEED AIRCRAFT CORP.
Georgia Division, Marietta, Ga.
by INTERNATIONAL STEEL
in co-operation with
ROBERT & CO. Associates,
Atlanta, Ga.: Architects & Engineers
BLOUNT BROS. CONSTRUCTION CO.,
Montgomery, Ala.: Contractor

You have to put up a BIG front for a flight hangar like the above — part of the immense Government Aircraft Plant No. 6, where Lockheed is producing Boeing-designed B-47's for the Air Force. And you have to all but fill it with doors, to provide an entrance huge enough for these giant Air Force Jets.

Lockheed's own needs were for 16 door sections — each 66 feet wide by 60 feet high — divided equally to form a dual-opening entrance. Each section operates singly — or any and all can be opened or closed concurrently. This adds up to two complete entrances each 528 feet wide — a total of 352 yards of combined door!

International was Lockheed's logical choice to handle this tremendous job. In operation, it duplicates other larger entrances designed and built by International. Much of the basic planning of these record-breaking projects was done with the help of International's door engineers.

This same experienced help can be put to work on your door problems . . . and on any problem involving steel fabrication . . . by calling in International. Mail coupon today for our complete catalog of Industrial and Aviation Doors.

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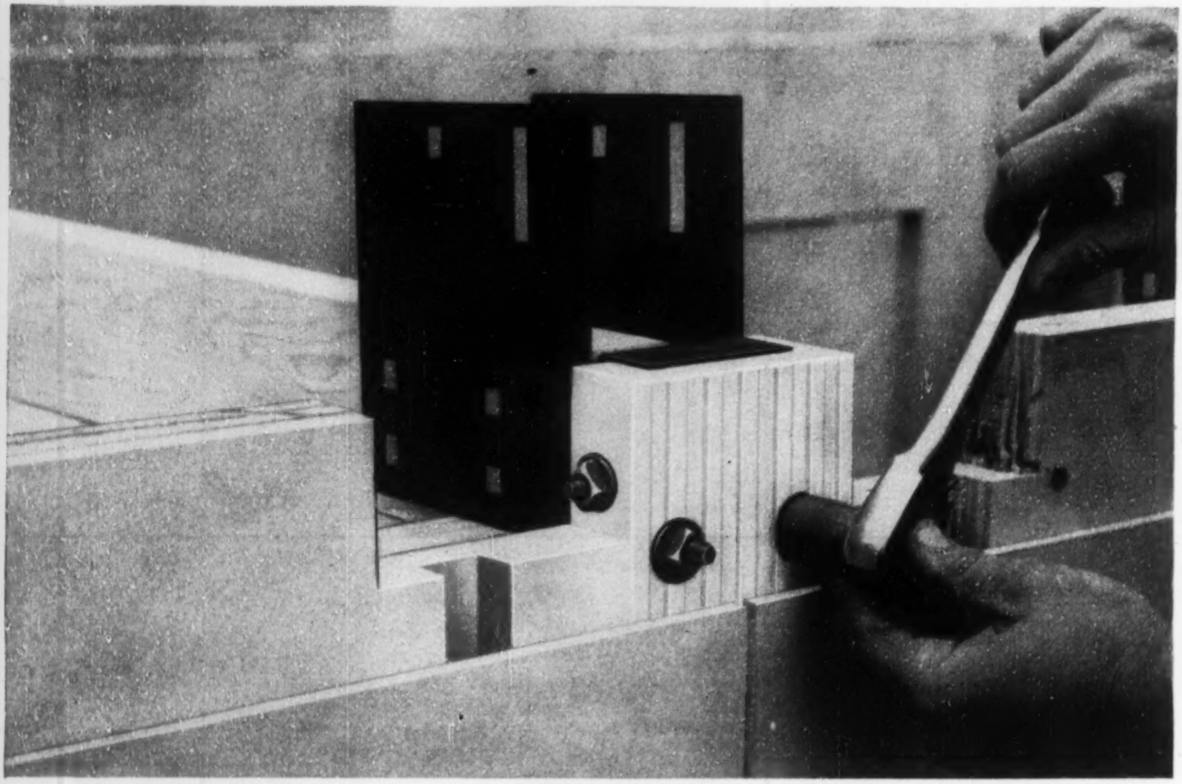


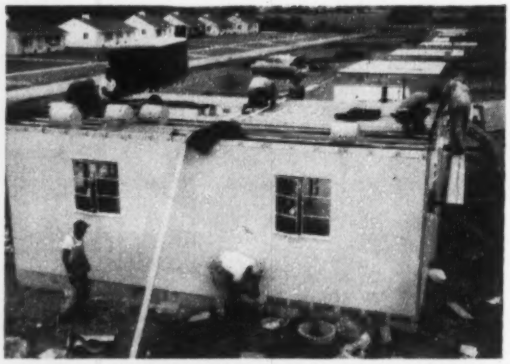
RAISING THE ROOF of a U.S. Steel home goes faster with help of RB&W bolts. Here workman is tightening bolt holding steel plate to exterior wall panel. Plate is then used as joint for bolting ceiling panels.

That's a house he's bolting together!

U.S. Steel Homes found that bolting together the panels of their fast-selling homes saves time and trouble. Nails are used only to hold panels temporarily in position for bolting and add no structural strength.

It's no accident, of course, that RB&W bolts and nuts were specified here. U.S. Steel Homes isn't the first to discover that the absolute uniformity and dependable holding power of RB&W products make them the best fasteners for any job. Workmen like the way RB&W nuts run on RB&W bolts fast and easy. And there's no question about the extra strength RB&W bolt-and-nut construction gives these homes.

Whenever you want to put something together *fast*, and make it stay fastened *for good*, give one of our men a ring. As a top-ranking maker of all kinds of fasteners, we're always able to recommend and supply the right ones for all your needs. You can count on fast delivery, too. RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY, Port Chester, N.Y.



HOUSE GOING UP. U.S. Steel home nears completion as workmen on scaffold (right) bolt on exterior panels. These sturdy homes offer quality construction at budget price.

3.8

RB&W

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Plants at: PORT CHESTER, N.Y.; CORAOPOLIS, PA.; ROCK FALLS, ILL.; LOS ANGELES, CALIF. *Additional sales offices at:* ARDMORE (PHILA.), PA.; PITTSBURGH; DETROIT; CHICAGO; DALLAS; SAN FRANCISCO. *Sales agents at:* PORTLAND, SEATTLE. *Distributors from coast to coast.*

CONSTRUCTION REPORTS

Bids Asked—Low Bidders—Contracts Awarded—First Section—

Compiled by Business News Department—Engineering News-Record, 330 W. 42nd St., New York 36, N. Y., ELSIE EAVES, Manager

J. A. MAHONEY, M. O. WETZEL, L. M. WINISKI, M. E. SCIORRA, F. S. DEMBEK, Reports.

J. H. WEBBER, M. R. ROESSLER, E. R. HUBER, Statistics.

NEW ENGLAND

BIDS ASKED—HEAVY CONSTRUCTION

† **Mass., Falmouth**—HOMING BEACON—B.A. On Or About 3/2—U. S. Eng., 857 Commonwealth Ave., Boston 15, Mass., inner homing beacon, Otis Air Force Base, ENG-19-016-54-84. Under $10,000. CD 7/10/52.

▲† **Mass., Bedford**—HANGAR—B.A. 3/4—U. S. Eng., 857 Commonwealth Ave., Boston, Mass., cantilever hangar, Hanscom Air Force Base, ENG-19-016-54-45. $2,500,000-$5,000,000. Plans deposit $25. CD 1/27.

† **Me., Bangor**—COLD STORAGE FACILITIES—B.A. On Or About 3/11—U. S. Eng., 857 Commonwealth Ave., Boston 15, Mass., addnl. cold storage facilities in existing Storehouse Bldg. T-105 Dow Air Force Base, ENG-19-016-54-76. $50,000-$100,000.

† **Me., Limestone**—FACILITIES, HEATING PLANT—B.A. On Or About 3/12—U. S. Eng., 857 Commonwealth Ave., Boston 15, Mass., addnl. facilities, Central Heating Plant, Limestone Air Force Base, Inv. ENG-19-016-54-83. CD 9/19/51.

BIDS ASKED—BUILDINGS

Conn., Southington—SCHOOL—B.A. 2/25—Town, Carl P. Verderame, chn. School Bldg. Comn., Town Hall, Milldale Elementary School addns., alterations. $300,000. Plans deposit $30. Carl J. Malmfeldt & Assocs., 36 Pearl St., Hartford, Conn., archt. CD 8/11.

▲ **Conn., Milford**—SCHOOLS—B.A. 3/3—Town, Bd. Educ., Town Hall, elementary school, Meadowside, $500,000, elementary school, Orange Ave., $500,000; Elementary School, Bryan Hill Area, $500,000. Plans deposit $25 each. Jesse James Hamblin, 1188 Main St., Bridgeport, Conn., archts. CD 7/22.

▲ **Conn., Litchfield**—SCHOOL—B.A. 3/16—Town, Leonard Hutchinson, chn. Bldg. Comn., Bd. Educ., Litchfield, concrete block Junior-Senior High School, $1,212,183. Marcel Breuer-O'Connor & Kilham, 101 Park Ave., New York, N. Y., archts. CD 8/12.

Conn., Litchfield—SCHOOL—B.A. 3/16—Town, Leonard Hutchinson, chn. School Bldg. Comn., Bd. Educ., Bantam Grammar School, Bantam. $432,602. Marcel Breuer-O'Connor & Kilham, 101 Park Ave., New York, N. Y., archts. CD 12/23.

SOON LETS CONTRACT—BUILDINGS

Conn., Hamden—PLANT, etc.—Eastern Industries, c/o Irving Rutherford, archt., 49 Garden St., Hartford, soon lets contract, manufacturing plant and office. $375,000. CD 1/4.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

North Atlantic Dredging Co., 62 Condor St., East Boston, Mass. LB **$57,900**, est. $60,000 dredging channel and basin Green Harbor, Marshville, MASSACHUSETTS. Commonwealth of Mass., Dpt. P. Wks., 100 Nashua St., Boston, Mass. Bids Feb. 2. CD 1/22.

Daddario-Piatelli, 73 Tremont St., Boston, Mass. LB Approx. **$422,695**, est. $400,000-$500,000. Contr. 2 pipe line Putnamville Reservoir, Danvers, SALEM and BEVERLY, MASS. Cities Salem and Beverly, Beverly Water Bd., c/o Salem City Treas., 93 Washington St., Salem, Mass. Bids Feb. 3. CD 1/26.

BUILDINGS

LOW BIDS AND CONTRACTS

H. Vincent Lindberg, 90 Electric Ave., Fitchburg, Mass. CA Est. **$165,000**. FACTORY addn., alterations, Crawford St., LEOMINSTER, MASS. The Charlton Co., Crawford St., Leominster, Mass. David J. Abrahams & Assoc., 651 Boylston St., Boston, Mass., archts.

C. Sullivan Co., Inc., 15 Clinton St., Newport, R. I. LB **$402,735**, est. $400,000. elementary SCHOOL, Dexter St., NEWPORT, R. I. City, Supt. Schools, City Hall, Newport, R. I. Bids Feb. 3. CD 1/19.

Anderson Fairoaks Constr. Co., 145 S. Marshall St., Hartford, Conn., CA, **$898,000** 90-unit MR-56 HOUSING, ENFIELD, CONN. Town Housing Auth., 60 Green Valley Village, Enfield, Conn. Bids Jan. 12, awarded Feb. 4. CD 1/19, under LB.

National Plazas, Inc., c/o Attorney James P. Doherty, 1224 Dixwell Ave., Hamden, Conn. Owner Builds, **$700,000**, SHOPPING CENTER, Dixwell Ave. north of Hamden High School, HAMDEN, CONN. CD 12/18.

▲ **Town, H. B. Matthews**, chn. Special Building Comn., c/o Supt. School Office, Hunting Hill, Middletown, Conn., rejected bids Dec. 13, Woodrow Wilson High SCHOOL addn., Hunting Hill Ave., MIDDLETOWN, CONN. LB **$1,190,000**. Will re-advertise. CD 1/4, under LB.

† **National Constr. Co.**, 767 East Third St., South Boston, Mass., CA, **$143,888**, imprv. POWER PLANT, Bldg. 29, Spec. 41592-13, NEW LONDON, CONN. P. Wks. Dpt., Submarine Base, New London, Conn. Bids Jan. 26. CD 2/2, under LB.

Hayes Constr. Co., 1285 East St., New Britain, Conn., LB, **$638,396**, school, Hatton Site, Spring Lake St. and South End Elementary SCHOOL addn., SOUTHINGTON, CONN. Town, School Bldg. Comn., Town Hall Southington, Conn. Bids Feb. 4. CD 1/18.

MIDDLE ATLANTIC

BIDS ASKED—HEAVY CONSTRUCTION

† **Pennsylvania**—B.A. After 2/8—U. S. Eng., 24 St. and Maryland Ave., P.O. Box 1715, Baltimore 3, Md. constr. Swoyersville-Forty Fort Flood Protection Project-Levee Unit No. 2 at Swoyersville-Forty Fort, in vicinity of Abrahams Creek which is a tributary of North Branch of Susquehanna River within Wyoming and West Wyoming Boros, Luzerne Co., Serial No. CIVENG-18-020-54-27. Plans deposit $10. CD 10/16/52.

N. Y., New York—BOILER PLANT—B.A. 2/23—New York City Transit Auth., 370 Jay St., Brooklyn, Zone 1, furnishing, installing boiler plant at 147 St. Yard, IRT Div., Manhattan Boro.

† **D. C., Wash.**—BUILDING ALTERATIONS—B.A. 2/24—Dist. P. Wks. Office, Potomac River Naval Command, Naval Gun Factory, Wash., D. C., Building 153 alterations, at Naval Air Station, Contract NOY 81458. Plans deposit $10.

New Jersey—B.A. 2/25—New Jersey Hy. Auth., State Hy. Dpt. Office Bldg., 1035 Parkway Ave., Trenton, relocating water mains under parkway South of Third River, Cities of Bloomfield and Clifton, Passaic and Essex Counties, Garden State Parkway Contract 136, Section 2. Plans deposit $10.

New Jersey—LIGHTING SYSTEM—B.A. 2/25—New Jersey Hy. Auth., State Hy. Dpt. Office Bldg., 1035 Parkway Ave., Trenton, Contract No. 70, Section 7, lighting system for Raritan River Bridge between Borough of Sayreville and Woodbridge Township, Middlesex Co. Plans deposit $10.

Delaware—B.A. 3/3—State Hy. Dpt., Dover, Port Penn Dikes and Tide Gates, New Castle Co., Contract 1304. Plans deposit $5. W. A. McWilliams, Dover, ch. engr.

Pa., Martinsburg—B.A. 3/8—F. B. Higgins, secy. The Municipal Auth. of Boro of Martinsburg, E. Allegheny St. water lines, Contr. 1, 12 in. rising main, 10 in. cannery main; Contr. 2, 8 in. extens. and reinforcing mains. Plans deposit $25. The Chester Engineers, 210 E. Park Way, Pittsburgh, Zone 12, engrs.

† **N. J., Beverly**—DRAINAGE FACILITIES—B.A. On Or About 3/9—U. S. Eng., 121 N. Broad St., Phila., 1, Pa., drainage facilities for Beverly National Cemetery, ENG-36-109-54-153.

† **Md., Camp Detrick**—UTILITIES—B.A. On Or About 3/11—U. S. Eng., First and Douglas Sts. N.W., Wash., 25, D. C., underground utilities incl. water sewer and contaminated sewerage systems, ENG-49-080-54-25-(22); roads, parking areas, storm drainage, fencing, ENG-49-080-54-23 (20); steam distr. sys., ENG-49-080-54-24-(21); electrical distr. sys., ENG-49-080-27-(24).

BIDS ASKED—BUILDINGS

▲ **N. Y., New Rochelle**—HOSPITAL—B.A. 3/1—New Rochelle Hospital, Guion Pl., 5 story hospital addn. $2,600,000. CD 11/8/46.

▲ **Pa., Colonial Park (P.O. Harrisburg)**—HIGH SCHOOL—B.A. 3/4—Central Dauphin School Dist. Auth., Byron Catherman, secy., Penbrook School Bldg., Harrisburg, Senior High School in Colonial Park at Houck's Rd and Locust Lane for Dauphin County Joint School Bd. $2,800,000. Plans deposit $50. E. G. Good, Jr., 904 N. 2nd St., Harrisburg, archt. CD 12/23.

SOON LETS CONTRACT—BUILDINGS

Md., Parksville—SHOPPING CENTER—Harris Enterprises, Parksville, soon lets contract 1 and 2 story, bsmnt., 100x250 ft., brick, concrete shopping center, $300,000. Howard R. Mason, 6411 Birchwood Ave., Baltimore, archt. CD 11/9.

N. Y., Brooklyn—APARTMENT—Equitable Life Assurance Society of U. S., 393 Seventh Ave., New York, Zone 1, soon lets contract, 7 story apartment at Clinton Hill Apartment Proj. $600,000. Irwin Clavan, 350 Fifth Ave., New York, Zone 1, archt.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

Petracca & Sons, Inc., 175-14 147 Ave., Jamaica, N. Y. LB **$167,804**, playground adjacent to P. S. 186, west of Little Neck Parkway, south of 72nd Ave., Queens Boro, Constr. No. Q-327-153B, BELLEROSE, N. Y. Comr. Parks, at office Dpt. Parks Arsenal Bldg., Central Park, 64 St. and 5 Ave., New York 21, N. Y. Bids Feb. 3. CD 1/25.

Acme Contg. Corp., 60 86th St., Brooklyn, N. Y., LB **$101,404**, playground adjacent to P. S. 273, Jerome to Warwick Sts., south of Wortman Ave., Contr. No. B-246-153B, BROOKLYN, N. Y. Comr. Parks, at office Dpt. Parks, Arsenal Bldg., Central Park, 64 St. and 5 Ave., New York 21, N. Y. Bids Feb. 3. CD 1/25.

Atlantic Gulf & Pacific Co., 15 Park Row, New York 7, N. Y., LB **$243,849**, preparation of site for placing sanitation fill, incl. constr. hydraulic fill dike and hydraulic fill stockpile in areas south of Flatbush Ave. between Boat Basin and Shore Parkway, in Marine Park, Brooklyn Boro, Contr. No. B-57-453 B, BROOKLYN, N. Y. Dpt. Parks, Arsenal Bldg., 64 St. and 5 Ave., New York 21, N. Y. Bids Feb. 3. CD 6/26/45.

▲ **PENNSYLVANIA**—State Hy. Dpt., 506 North Office Bldg., Harrisburg,

John H. Swanger, Inc., P.O. Box 1214, Lancaster, Pa., CA **$1,122,147**, constr. 21,009 ft. rein.-con. road divided, variable in width, deck plate girder bridge, T.R. U.S. 1, Greencastle Boro, Antrim Twp., Franklin Co. Bids Jan. 26, awarded Feb. 5. CD 1/29, under LB.

PENNSYLVANIA—State Hy. Dpt., 506 North Office Bldg., Harrisburg,

Charles A. Imel & Son, 34 Greenville Ave., Clarion, Pa. CA **$581,869**, widening 80,139 ft. road with crushed aggregate base variable in width and surf. new and existing base with bit. surf. 22 ft. wide, T.R. 219, McKean Co. Bids Jan. 27. Awarded Feb. 5. CD 2/1, under LB.

Frank Briscoe Co., Inc., 287 S. 19 St., Newark, N. J., LB, **$599,288**, Contract GWB 140-008, toll booths and canopy New Jersey Plaza, George Washington Bridge, FORT LEE, N. J. Port of New York, 111 8th Ave., New York, 11, N. Y. Bids Feb. 2.

MARYLAND—State Rds. Comn., 108 E. Lexington St., Baltimore, Zone 2,

Ford D. Fox & Co., 5717 Harford Rd., Baltimore, Md. LB **$92,859**, resurf. 3.2 mi. sect. of Baltimore Blvd. U. S. Rte. 1, Baltimore City Line to Rolling Rd., Contr. B 671-420, Baltimore Co. Bids Feb. 2. CD 1/19.

Allied Contractors, Inc., 204 E. Preston St., Baltimore 2, Md. LB **$89,242**, constr. truck weighing station, traffic lanes, near Laurel, HO-234-12-714, Howard Co., MARYLAND. State Rds. Comn., 108 E. Lexington St., Baltimore 2, Md. Norman C. Pritchett, c/o owner, ch. engr.

Roland B. Duke, Leonardtown, Md. LB **$62,561**, greenhouse and attendants quarters and drive at Andrews Air Force Base, ANDREWS, MD. State Rds. Comn., 108 E. Lexington St., Baltimore 2, Md. Norman C. Pritchett, c/o owner, ch. engr.

▲ **Brooklyn Eng. Corp.**, 1100 E. 25 St., Baltimore 18, Md., CA **$1,493,955**. O'Donnell St. viaduct, beam spans over railroad tracks, balance concrete walls, earthfill, BALTIMORE, MD. City, Bureau Hy., 303

PROJECTS COVERED

Projects—By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterways $34,000; other public works $60,000; industrial buildings $82,000; other buildings $300,000.

Classes of Construction

(Name in order of Listing)

- **Water Supply**
- **Sewers, Waste Disposal**
- **Bridges**
- **Streets & Roads**
- **Earthwork, Waterways**
- **Latin America**
- **Public Buildings**
- **Commercial Buildings**
- **Industrial Buildings**
- **Unclassified**

Stages Reported

PROPOSED WORK: Including appointment of engineers or architects.

BIDS ASKED (new announcements only). For full calendar, see also preceding issues of ENR.

LOW BIDDERS: On jobs below $500,000 value all low bidder news will be the final reports published on the projects invloved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.

CONTRACTS AWARDED: Except awards to low bidders previously reported in low bidder stage.

Dates shown are of issue in which last previous report was published.

Symbols and Abbreviations Include:

†	Federal Government
▲	Project of $1,000,000 or over.
B.A.	Bids Asked
ENR	Engineering News-Record
CD	Engineering News-Record Construction Daily

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Hotel
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New York
City

IRONITE
Keith
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Building
Columbus

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Princeton
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Municipal Bldg., Baltimore 2, Md. Bids Jan. 27. CD 1/29, under LB.

Spiniello Constr. Co. & Nestro Constr. Co., Wallace St., Orange, N. J., LB **$104,300.** cleaning and lining water mains, Washington St., BALTIMORE, MD. City, Bureau Water Supply, 503 Municipal Bldg., Baltimore 2, Md. W. J. Strohmeyer, c/o owner, water engr. CD 11/17/50.

Joseph F. Hughes & Co., Inc., 5 E. Franklin St., Baltimore 2, Md., LB **$311,474.** concrete, steel Four Field lighting towers, part of Memorial Stadium Proj., BALTIMORE, MD. City, Bureau Bldg. Constr., 410 Municipal Bldg., Baltimore 2, Md. L. P. Kooken Co., 2017 Maryland Ave., Baltimore, Md., engr. CD 11/17/50.

† **Federal Electric Products Co.**, 1601 Munsey Bldg., Baltimore, Md. LB **$488,642**, main electrical unit sub-station Serial DA-18-020-Eng. 54-17, FORT GEORGE G. MEADE, MD. U. S. Eng., 24 St. and Maryland Ave., Baltimore, Md. Bids Feb. 2. CD 1/18.

Peter D'Adamo & Son, 2441 N. Charles St., Baltimore 18, Md. LB **$125,697**. Items 1, 5 to 8;

Chas. J. Spielman, 2901 Maisel St., Baltimore, Md. LB **$111,279.** Items 2, 3, 4, Contr. 358 D.S. & W. group bids, various sections, TOWSON, MD. Comrs. Baltimore Co., Court House, Towson, Md. Bids Jan. 28. CD 1/19.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ **Psaty & Fuhrman, Inc.**, 369 **Lexington Ave., New** York 17, N. Y., CA **$1,447,000.** WELFARE CENTER BLDG., Jay and Johnson Sts., **BROOKLYN, N. Y.** Dpt. P. Wks., Municipal Bldg., **New York** 7, N. Y. Bids Dec. 30. CD 1/8, under LB.

▲ **Kane & Schwartz**, c/o Lambert & Dell'Abate, engrs., 1 E. 42 St., New York 17, N. Y. Owner Builds. **$2,000,000**, SHOPPING CENTER, Sunrise Hy., BABYLON, N. Y.

Glendale Homes, Inc., c/o Milton F. Kirchman, archt., 230 W. 13 St., New York 11, N. Y. Owner Builds. **$300,000.** 23 HOUSES, E. 29 St. and Avenue Z, BROOKLYN, N. Y.

Glenridge Homes, c/o Stanley H. Klein, archt., 89-31, 161 St., Jamaica, N. Y. Owner Builds. **$730,000.** 73 HOUSES, Pulaski Rd. east of Larkfield Rd., EAST NORTHPORT, N. Y.

▲ **Garden City Manor Homes**, c/o Joseph Watterson, archt., 231 Mineola Blvd., Mineola, N. Y. Owner Builds. **$1,000,000.** 55 HOUSES on tract on Meadow St. near Clinton Rd., GARDEN CITY, N. Y.

Great Oaks Homes, c/o Karl Bloch, archt., 7 Landsdown Ave., Merrick, N. Y. Owner Builds. **$500,000.** 25 HOUSES, tract at Meadowbrook and Mill Rds., MERRICK, N. Y.

▲ **Jack & Norman Rappaport**, c/o Maxfield Blaufeux, archt., 44 Court St., Brooklyn 2, N. Y. Owner Builds. **$1,000,000.** Great Lincoln SHOPPING CENTER, Long Beach Rd., Atlantic Ave., Smith St. and Lower Lincoln Ave., OCEANSIDE, N. Y.

▲ **Ashworth Village, inc.**, c/o Leonard G. Feinen, archt., 320 Lincoln Ave., Hasbrouck Heights, N. J. Owner Builds. **$3,000,000.** garden APARTMENT for 400-families, 57-acre tract, Rte. 9, WAPPINGERS FALLS, N. Y.

Ace Development Corp., c/o Henry Moger, Jr., archt., 250 Main St., White Plains, N. Y. Owner Builds. **$500,000.** 20 HOUSES on tract on Havilands Lane, WHITE PLAINS, N. Y.

▲ **William Domnitz**, c/o William G. Chirgotis, archt., 968 Stuyvesant Ave., Union, N. J. Owner Builds, **$1,300,000.** garden apartment for 130 families to be called North Brunswick Gardens, at Georges Rd. and Route 25, NORTH BRUNSWICK, N. J.

▲† **Earl L. Cump**, 251 Park Ave., Chambersburg, Pa. CA **$2,001,700**, 100 mounded (earth) concrete IGLOO MAGAZINES, Letterkenny Ordnance Plant, ENG-18-020-54-19, LETTERKENNY, PA. U. S. Eng., 24 St. and Maryland **Ave., Baltimore, Md. Awarded Jan. 2.** CD **2/3, under LB.**

John McShain, Inc., 17th and Spring Garden Sts., Phila. CA **$650,000.** general contract CHAPEL for Cathedral of St. Peter & Paul, 1723 Race St., PHILA., PA. Roman Catholic Archdiocese of Phila., 1712 Summer St., Phila., Pa. Eggers & Higgins, 100 E. 42 St., New York, N. Y., archts.-engrs.

▲ **John McShain, Inc.**, 17 and Spring Garden Sts., Phila., Pa., CA **$6,647,000.** Total $10,000,000. general contract two new bldgs. 8 and 10 stories, PRIVATE PATIENTS BLDG. and an OUTPATIENTS BLDG. at Temple University Medical Center, Broad, Park, Ontario and Tioga Sts., PHILA., PA. Temple University Hospital, **Broad and Berks Sts., Phila., Pa.** CD 1/20, under LB.

† **American Constr. Corp.**, 261 Constitution Ave. N.W., Wash., D. C. CA **$519,500.** Dahlgren HALL addn., alterations, NOY 79372, Spec. 39729 ANNAPOLIS, MD. U. S. Naval Academy, P. Wks. Officer, Annapolis, Md. CD 12/23, under LB.

Pan-American Contg. Co., 6101 Eastern Ave., Baltimore, Md. Owner Builds, forty-five 1½ story DWELLINGS 6100 and 6200 blocks Eastern Ave., BALTIMORE, MD.

Haskell Builders, Inc., 2412 N. Charles St., Baltimore, Md. CA **$307,000.** 34 brick row type HOMES, Westchester, Clayton, Fairfax and Bonner Rds., BALTIMORE, MD. Bon Fax Realty Co., 2412 N. Charles St., Baltimore, Md. I. A. Baker, 11 E. 21 St., Baltimore, Md., archt.

W. E. Bickerton Constr. Co., 101 W. 22 St., Baltimore, Md. CA **$140,000.** 1 and 2 story, 50x230x20 ft., steel, masonry TERMINAL and OFFICE, BALTIMORE, MD. Mushroom Transportation Co., Inc., 2410 S. Charles St., Baltimore, Md.

Polinger Constr. Corp., 1214 Ruatan St., Silver Spring, Md., CA Approx. **$330,000-$350,000**, 18 two and three story, 40x80 ft. brick APARTMENTS, 212-units, SILVER SPRING, MD. University Park Homes,

(Continued on page 243)

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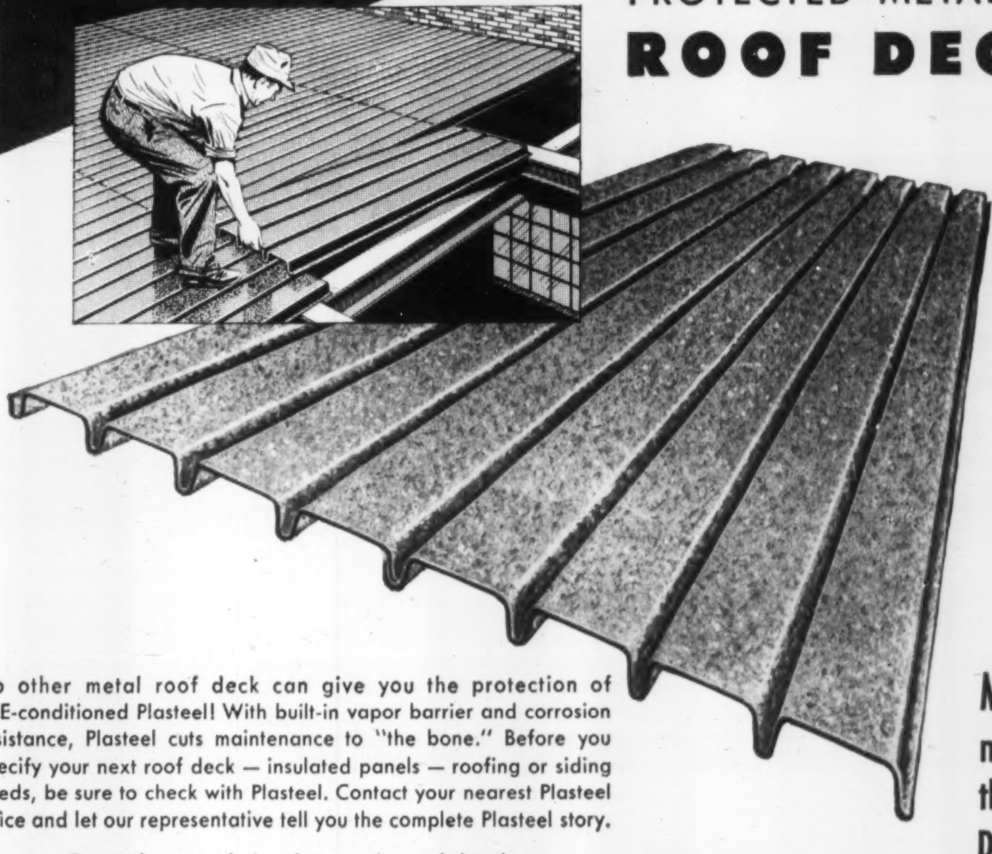

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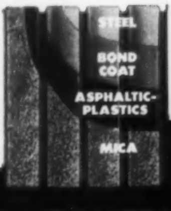

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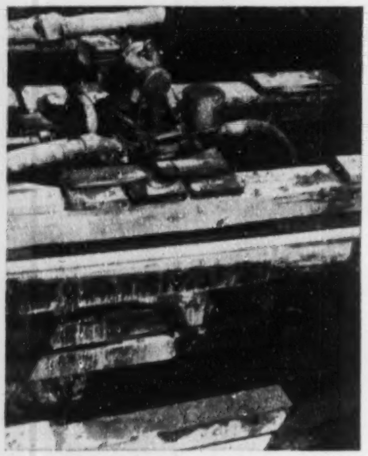
A pump failure may hold up the job, cause men to be idle, tie up other equipment, or even prevent finishing the contract on time.

The best insurance is to have a pump that has proved itself on many tough assignments.

The Gorman-Rupp Company of Mansfield, Ohio claims that their pumps will out-perform any pump of comparable size and type on the market. So states their guarantee. The greater capacity of these pumps when working against high heads is very important to the contractor. They are the simplest of pumps and practically trouble-free. They never quit on the job. Years of study and research by engineers in the field and the laboratory have made possible these claims and the guarantee.



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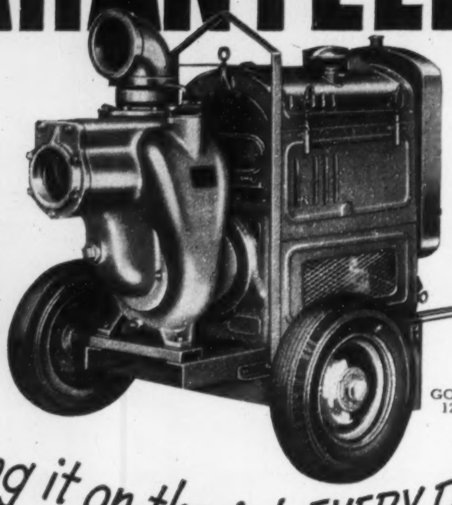

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SOLVE YOUR PUMPING PROBLEMS

GORMAN-RUPP
SELF-PRIMING
CENTRIFUGAL PUMPS

THE GORMAN-RUPP COMPANY
MANSFIELD, OHIO

(Continued from page 240)

Inc., c/o contractor. H. Cunin, 5725 6th St. N. W., Wash., D. C., archt.

Commercial Constr. Co., 1200 15 St. N.W., Wash., D. C., CA, **$350,000**, one 4 story, brick, steel STORES and OFFICES, 4435 Wisconsin Ave. N.W., WASH., D. C. Burman Properties, Inc., 1200 15 St. N.W., Wash., D. C. Arthur E. Allen, 1200 15 St. N.W., Wash., D. C., archt. CD 6/26/52.

Master Builders, Inc., 4805 Rhode Island Ave., Wash., D. C., CA, **$560,000** 40 semi-detached HOMES, Tuckerman St. N.E., Riggs Manor; **$300,000** five 48-unit apartments, 13 and Valley St. S.E. WASH, D. C. Zipkin, Inc., 4805 Rhode Island Ave. N.E. Wash., D. C. Earl Von Reichenbach, 1219 Good Hope Rd. S.E., Wash., D. C., archts.

SOUTH

BIDS ASKED—HEAVY CONSTRUCTION

▲ **N. C., Charlotte**—B.A. 3/4—City, City Hall, Irwin Creek sewage plant addn. $1,500,000. Plans deposit $50. J. N. Pease & Co., 119½ E. 5 St., Charlotte, engr. CD 2/3.

† **Fla., Tampa**—BUILDINGS REPAIRS—B.A. On Or About 3/9— U. S. Eng., P. O. Box 4970, Jacksonville, misc. repairs to ORC Buildings, Drew Field, Serial No. Eng-08-123-54-38.

BIDS ASKED—BUILDINGS

Va., Hillsville—HIGH SCHOOL—B.A. 2/23—Carroll Co. School Bd., Hillsville, Hillsville High School addns. Plans deposit $30. Smithey & Boynton, 112 W. Kirk Ave., Roanoke, archts.

Ala., Grove Hill—COURT HOUSE—B.A. 2/25—Clarke County, court house, $400,000. Extended date. Chas. H. McCauley, Jackson Bldg., Birmingham, archt. CD 1/29.

SOON LETS CONTRACT—BUILDINGS

Fla., Coral Gables—SCHOOL OF MUSIC—University of Miami, 1200 Campo Santo Ave., soon lets contract, Arnold Volpe School of Music Bldg. $500,000. Robert M. Little, 2180 Brickell Ave., Miami, archt.

▲ **Miss., Jackson**—PACKING PLANT—Swift & Co., Stockyards, Chicago, Ill., soon lets general contract packing plant, $1,000,000. CD 8/11.

Miss., Tupelo—PLANT—Gulf Refining Co. 127 Elks Pl., New Orleans, La., soon lets contract oil storage plant.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

† **J. L. Coe Constr. Co.**, P.O. Box 1881, Charlotte, N. C., LB **$298,583**, Wing Sect M, garage, U. S. Marine Corps Air Stations, NOY 78252, CHERRY POINT, N. C. P. Wks. Office, Fifth Naval Dist., U. S. Naval Base, Norfolk 11, Va. D. M. Mackintosh & Co., 1201 Elizabeth Ave., Charlotte, N. C., archts. Bids Feb. 2. CD 1/13.

† **Daniel Constr. Co.**, 822 7 Ave. S., Birmingham, Ala. LB **$769,738**, electronics bldg. Naval Air Station NOY 5238, JACKSONVILLE, FLA. Dpt. Navy, P. Wks. Officer, Naval Base, S. C. Bids Feb. 4. CD 1/5.

Chicago Bridge & Iron Co., 57 Forsyth St., Atlanta, Ga., CA, **$35,000**, furnishing, erecting steel elevated water storage tank, COLUMBUS, MISS. City, City Hall, Columbus, Miss. Bids Jan. 29. CD 1/7/48.

† **Southern Constr. Co.**, Daniel Field, Augusta, Ga., LB, **$906,453**, buildings for Air National Guard, Inv. 54-37, GULFPORT, MISS. U. S. Eng., P.O. Box 1169, Mobile 7, Ala. Bids Feb. 3. CD 1/26.

B. E. Walker, P.O. Box 1249, Jackson, Miss., CA, $89,844. Project 13-W (A), water mains, JACKSON, MISS. City, City Hall, Jackson, Miss. Bids Jan. 28. CD 12/8/52.

† **Jahncke Service, Inc.**, 814 Howard Ave. New Orleans, La., LB **$101,910**, maintenance dredging 64,500 lin. ft. channel in Gulf Intracoastal Waterway, Orleans Parish, Inv. 54-146, LOUISIANA. U. S. Eng., foot of Prytania St., New Orleans, La. Bids Feb. 2. CD 1/13.

Boh Bros. Constr. Co., 2400 Cypress St., New Orleans, La, LB, **$524,500**, Contract 164-W modifications to Basins G-3 and G-4 at water purification plant, NEW ORLEANS, LA. Sewerage & Water Bd., 526 Carondolet St., New Orleans, La. Bids Feb. 3. CD 1/13.

▲ **KENTUCKY**—ILLINOIS—Commonwealth of Ky., Dpt. Hys., Frankfort, Ky.

R. B. Tyler Co., 1446 Levering St., Louisville, Ky. LB, **$457,058**, bridge approaches;

Traylor Brothers, U. Mt. Vernon Rd., Evansville, Ind., LB, **$1,036,563**, substructure;

Allied Structural Steel Co., 20 N. Wacker Dr., Chicago, Ill., LB, **$2,806,924**, superstructure for bridge over Ohio River Morganfield-Shawneetown Road, near Shawneetown, Ill. Bids Feb. 5. CD 1/11.

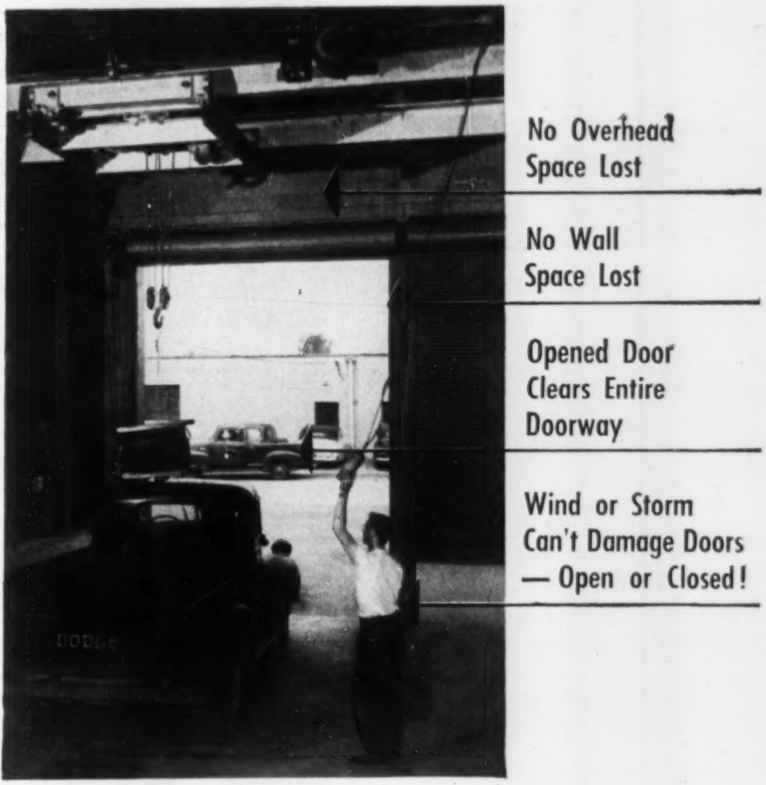
BUILDINGS

LOW BIDS AND CONTRACTS

▲ **Reinsch Constr. Co.**, 4012 Columbia Pike, Arlington, Va. Owner Builds. Approx. **$2,000,000**. 240 three story masonry APARTMENT units, ARLINGTON, VA. CD 11/27.

Lambert Constr. Co., Huntington, W. Va., CA **$681,586**, Junior HIGH SCHOOL, CHARLESTON, W. VA. Kanawha Co. Bd. Educ., Quarrier and Elizabeth Sts., Charleston, W. Va. Bids Jan. 21, awarded Feb. 4. CD 1/26, under LB.

▲ **Pimmitt Development Corp.**, 206 Spring Dr., Falls Church, Va. Owner Builds. **$1,680,000**. 280 one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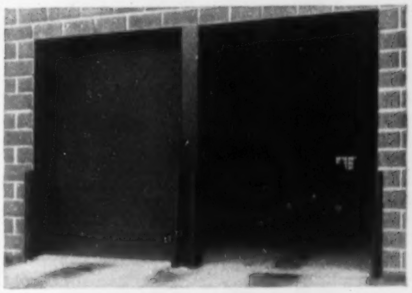

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story, frame, masonry RESIDENCES, near FALLS CHURCH, VA.

National Bank of Commerce Bldg., 300 Main St., Norfolk, Va., rejected bids Dec. 29, 2 story bsmnt. rein.-con., masonry Colonial Ave. OFFICE, NORFOLK, VA. LB **$715,000.** CD 1/5 under LB.

▲ **Algernon-Blair, Inc.,** P.O. Box 749, Montgomery, Ala. CA **$3,769,863.** 515 two story masonry, rein.-con. Public HOUSING units, VA-1-5, PORTSMOUTH, VA. Portsmouth Redevelopment & Housing Auth., 1900 Columbus St., Portsmouth, Va. Bids Jan. 19. CD 1/25, under LB.

Skinner & Ruddock, P.O. Box 750, Charleston, S. C. CA **$590,000.** HOSPITAL, BARNWELL, S. C. Barnwell Co., Barnwell, S. C. CD 1/26, under LB.

Ira H. Hardin Co., 174 Mills St. N.W., Atlanta, Ga., CA, **$929,870** mfg. PLANT, ATLANTA, GA. Blue Plate Foods, Inc., 1591 Murphy Ave., S.W., Atlanta, Ga. Bids Jan. 19. CD 1/26, under LB.

Strether-Barge Co., 189 Cain St. N.E., Atlanta, Ga., CA, **$142,225,** WAREHOUSE, ATLANTA, GA. Georgia National Guard Bureau, Dobbins Air Force Base, Marietta, Ga. CD 12/16, under LB.

△ **Robert E. McKee, Inc.,** Box 2848, Dallas, Tex., LB, **$18,732,000** general contract;

Otis Elevator Co., 39 Harris St. N.E., Atlanta, Ga., LB, **$1,184,236,** elevators for Grady HOSPITAL, ATLANTA, GA. Fulton-DeKalb Hospital Auth. 36 Butler St. S.E., Atlanta, Ga. Bids Feb. 4. CD 11/30.

Claussen & Webster, 1394 Gwinnett St., Augusta, Ga., LB, **$535,700,** OFFICE, AUGUSTA, GA. Professional Building, Inc., S.F.C. Bldg., Augusta, Ga. Bids Jan. 15. CD 1/14.

W. B. Johns, Tifton, Ga., CA, **$728,450,** SCHOOL, DALLAS, GA. Paulding Co. Bd. Educ., Dallas, Ga. Bids Jan. 21. CD 1/29, under LB.

▲ **Coite Somers Co.,** Vidalia, Ga., CA, **$1,046,000,** SCHOOL projects, LEXINGTON, GA. Oglethorpe Co. Bd. Educ., Lexington, Ga. Bids Jan. 28. CD 12/29.

▲ **Feldman Building Corp.,** 605 Lincoln Rd., Miami Beach, Fla., LB, **$1,120,000,** HOTEL, MIAMI BEACH, FLA. Wedgewood Hotel, 4111 Collins Ave., Miami Beach, Fla.

† **Kaminer Constr. Co., Inc.,** 303 S. Hudson St., Greenville, S. C., CA, **$555,281** HEATING PLANT, hardstanding for Depot Maintenance Shop, Anniston Ordnance Depot, ANNISTON, ALA. U. S. Eng., P. O. Box 1169, Mobile 7, Ala. Bids Jan. 12. CD 2/8, under LB.

W. P. Bridges, 3707 Jayne Ave., Jackson, Miss. Owner Builds, **$350,000,** 41 RESIDENCES, JACKSON, MISS.

Flint Brothers Constr. Co., Deposit Guaranty Bank Bldg., Jackson, Miss., CA, **$132,730,** AUTO SALES and SERVICE BLDG., addn. JACKSON, MISS. Milner Chevrolet Co., 209 E. Pearl St., Jackson, Miss. CD 7/14/52.

Southern Builders, Inc., Box 1815, Shreveport, La., LB, **$316,000.** masonry, steel WAREHOUSE, 2440 Linwood Ave., SHREVEPORT, LA. Lee Dry Goods Dept. Store, Inc., 301 Crockett St., Shreveport, La. Bids Feb. 2. CD 1/27.

Thorpe Constr. Co., Box 22, Evansville, Ind., CA **$763,000.** HIGH SCHOOL, HENDERSON, KY. Henderson Co. Bd. Educ., Henderson, Ky. Bids Jan. 18, awarded Jan. 29. CD 1/25, under LB.

J. E. Willard & Son, 422 Front St., Knoxville, Tenn. CA **$842,000.** HOSPITAL, MORRISTOWN, TENN. City and Hamblen Co., Morristown, Tenn. Bids Jan. 28. CD 1/14 under LB.

James A. Baker, 112 19th Ave. N., Nashville, Tenn. LB **$416,000.** brick, stone, steel new auditorium, gymnasium, remodeling of Cameron HIGH SCHOOL;

W. F. Holt & Sons, 1119 Laurel St., Nashville, Tenn. LB **$404,013,** brick, steel, stone Trimble Elementary SCHOOL, NASHVILLE, TENN. Davidson Co. Bd. Educ., Court House, Nashville, Tenn. CD 3/29/48.

MIDDLE WEST

BIDS ASKED—BUILDINGS

Ill., Evanston—CHURCH—B.A. 2/23—Beth Emet Synagogue, Dempster St. at Ridge Ave., church $300,000. Isadore H. Braun, 173 W. Madison St., Chicago, Zone 3, archt. CD 9/30.

▲ **Ill., Chicago** — DORMITORY — B.A. 3/2 — Loyola University, 6525 Sheridan Ave., 3 story, bsmnt., men's dormitory. $1,200,000. Neiler, Rich & Bladen, 431 S. Dearborn St., Zone 5, engrs. Barry & Kay, 53 W. Jackson Blvd., Zone 4, archts. CD 10/21.

Ind., Gary—SCHOOL—B.A. 3/9—School City of Gary 524 Garfield Ave., Webster Elementary School, 37 and Pierce Aves. $425,000. Beine Hull & Curran, 607 Broadway, archts. CD 5/11.

▲ **Wis., Milwaukee**—HOSPITAL—B.A. 3/9—Evangelical Deaconess Hospital Assn., 1821 W. Wisconsin Ave., two wings, 4 story bsmnt., 40x200 ft., 40x70 ft. hospital addn. Extended date. Magney, Tusler & Setter, 202 Foshay Tower, Minneapolis, Minn., archts. CD 1/18.

▲ **Wis., Milwaukee**—HOSPITAL—B.A. 3/18—St. Francis Hospital Corp., 3249 S. 18 St., 202-bed, 7 story and ground floor, T-shaped, 51x321 ft., 88x135 ft. hospital, 1 and 2 story, 46x158 ft., 40x64 ft., service bldg., 2 story, 28x85 ft., garage-dormitory. $5,000,000. Plans deposit $50. Francis S. Gurda, 1015 W. Mitchell St., archt. CD 1/26/50.

Ill., Chicago—FACTORY—Bids Asked—Florence Mfg. Co., 6018 S. State St., 10,000 sq. ft. factory, $82,000. M. J. McCarthy, 6201 S. Washtenaw St., archt.

Mich., Imlay City—PLANT—Bids Asked—Michigan Milk Producers Assn., 406 Stephanson Bldg., Detroit, masonry processing milk plant to handle milk waste, $90,000, Sewell & Schoettley, 730 Michigan Bldg., Detroit, archts.

SOON LETS CONTRACT—BUILDINGS

Ill., Decatur—PLANT, etc.—Caterpillar Tractor Co., 600 W. Washington St., East Peoria, soon lets contract structural steel only for parts mfg. plant and warehouse. Total est. $7,000,000. Giffels & Vallet, Inc. 100 Marquette Bldg., Detroit, Mich., archt. CD 7/17.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲ **Sollitt Constr. Co.,** 301 Columbia St., South Bend, Ind., LB, **$5,587,044;** sewage treatment plant and misc. sewers.

H. W. Hunter Co., Plymouth, Ind., LB, **$109,305,** sewer lift station, SOUTH BEND, IND. Bd. P. Wks., City Hall, South Bend, Ind. Bids Jan. 28. CD 12/29.

Illinois Hydraulic Constr. Co., 20 N. Crystal St. Elgin, Ill., CA, **$90,750,** Slade Ave. Pumping station addn., ELGIN, ILL. City, Elgin, Ill. Awarded Jan. 28.

Sangamo Constr. Co., 700 N. MacArthur Blvd., Springfield, Ill., LB, **$102,308,** widening, resurf., 2,115 ft. city streets; LB **$131,411,** paving 3,661 ft. city streets;

Sankey Bros. Co. Inc., 402 Illinois Bldg., Springfield, Ill., LB, **$86,114,** widening, resurf., 2,666 ft. city streets, SPRINGFIELD, ILL. City, City Hall, Springfield, Ill. Bids Feb. 2. CD 1/16/52.

BUILDINGS

LOW BIDS AND CONTRACTS

R. M. Miller & Assocs., 6824 Salem Pike, Cincinnati, O. Owner Builds. **$405,000.** 31, 1 and 1½ story, bsmnt., brick, HOMES, Salem Rd. and Whitehall Ave., CINCINNATI, O. Wilbur M. Firth, 7124 Montgomery Rd., Cincinnati, O., archt. Jack H. Fuller, 202 Wooster Pike, Milford, O., engr. Awarded Fab. 3.

Superior Constr. Co., 1800 E. 7 St., Gary Ind., CA, **$450,000,** CHURCH and PARISH HALL, GARY, IND. St. Luke's Roman Catholic Church, 640 Vernon St., Gary, Ind. Bids Jan. 26, awarded Jan. 29. CD 1/13.

Associated Builders, 2417 Rush St., East Gary, Ind., Own Forces, **$750,000,** 70 HOMES in Gary, East Gary Hobart and New Chicago, GARY, IND.

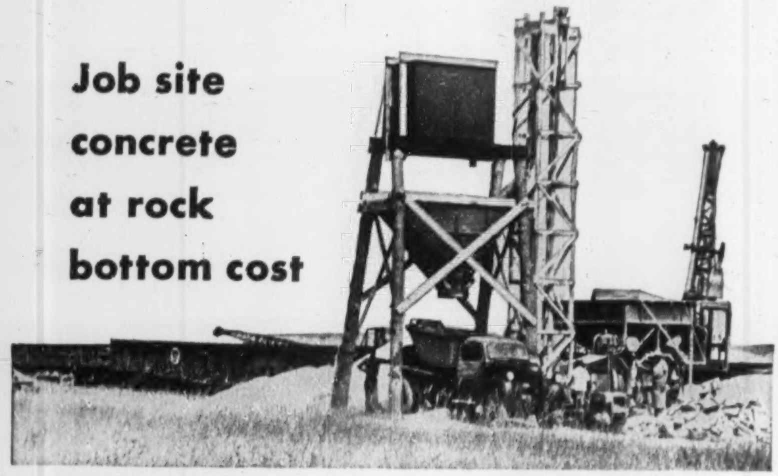
▲ **W. J. York,** Cameron Village, Raleigh, N. C., CA, **$7,000,000,** SHOPPING CENTER, Clark St. and Route 20, GARY, IND. Tri City Shopping Plaza, Gary, Ind. Frederick W. Collins, 545 Broadway, Gary, Ind., arch.

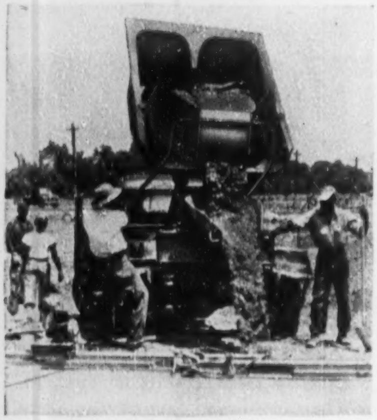
Associated Builders, 608 Michol Ave., Anderson, Ind., CA, **$670,000,** Consolidated Twp. SCHOOL, GREENTOWN, IND. Eastern School Corp., Greentown, Ind. Awarded Feb. 4. CD 8/12.

Industrial Development, Inc., 7900 Pendleton Pike, Indianapolis, Zone 44, Ind., CA, **$500,000.** 1 story 80x250 ft., brick, stone SHOPPING CENTER and parking plot,

(Continued on page 247)

Job site concrete at rock bottom cost





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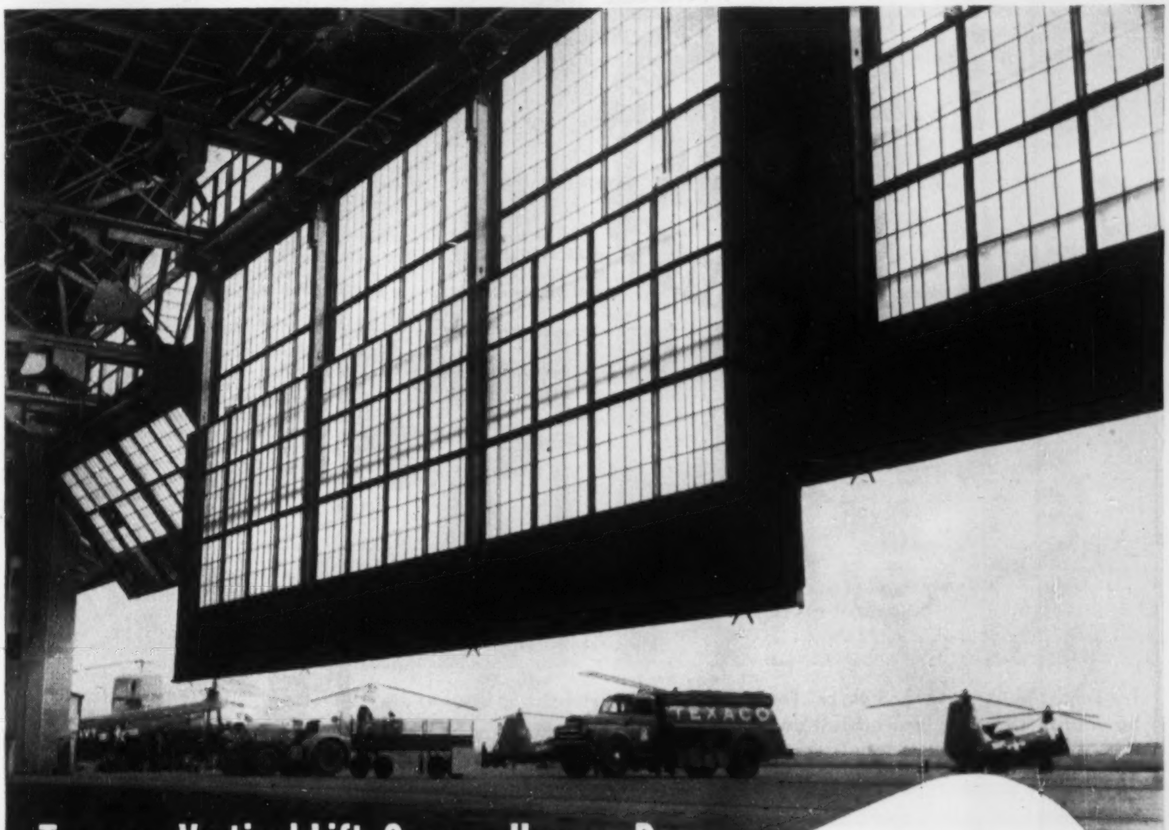

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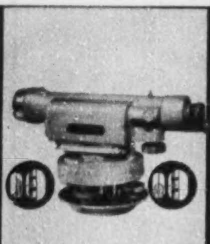

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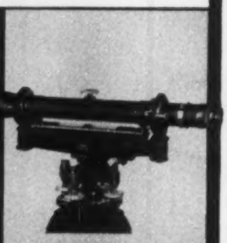

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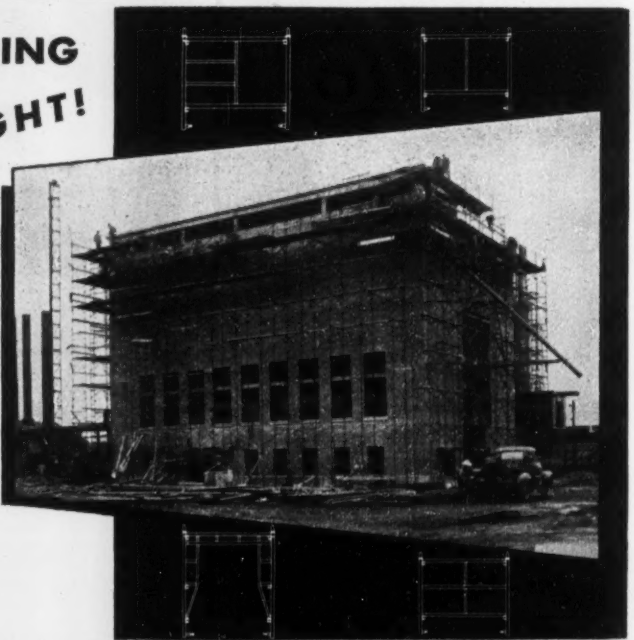

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SAN CARLOS, CALIFORNIA

(Continued from page 244)

6439 E. Washington St., INDIANAPOLIS, IND. Atlas Food Plan, Max Atlas, pres., 1912 N. Meridian St., Indianapolis 2, Ind. Vincent Ney, 3726 N. Penna. St. Indianapolis 5, Ind., engr. Awarded Feb. 4.

Leslie Colvin Constr. Co., Bd. Trade Bldg., Indianapolis, Ind., CA, **$500,000** men's DORMITORY, RICHMOND, IND. Earlham College, Rufus M. Allen, chn. Bd. Trustees, Richmond, Ind. Awarded Feb. 3. CD 10/30/52.

Lamp Constr. Co., 112 E. Division St., Elgin, Ill., LB, **$350,000,** OFFICE bldg., AURORA, ILL. Farmers Underwriters Assoc., 4680 Wilshire Blvd., Los Angeles, Calif. Austin, Field & Fry, 2311 W. 3 St., Los Angeles, Calif., archts. Gray, Laz & Mall, 909 S. Batavia St., Geneva, Ill., assoc. archts. Bids Jan. 29. CD 1/28.

J Emil Anderson & Son Co., 1809 Balmoral St., Chicago, 40, Ill., CA, **$560,000**. 71,000 sq. ft. FACTORY and OFFICE, 25 and Harvard Aves., BROADVIEW, ILL. Boyar-Schultz Corp., 2110 Walnut St. Chicago, Ill. Awarded Jan. 28.

Jos. Goth & Co., 3801 Pueblo Ave., Chicago, Ill., Own Forces, **$300,000,** 20 HOMES, CHICAGO, ILL. B. J. Bruns, 4734 N. Hermitage St., Chicago, Ill., archt.

Torok Constr. Co., 10310 S. Michigan Ave., Chicago, Ill., Own Forces, **$850,000,** 60 HOMES, CHICAGO, ILL.

En Jay Constr. Co., 105 W. Madison St., Chicago, 3, Ill., CA, **$800,000,** FACTORY, 99 and Cottage Grove Ave., CHICAGO, ILL. Jay Potato Chip Co., 4052 S. Western Ave., Chicago, Ill. Awarded Feb. 1. CD 12/23.

▲ **G. W. Lindstrom,** 2155 Farrell Ave., Park Ridge, Ill., Own Forces, **$1,500,000,** SHOPPING CENTER, Dempster St. at Vernon Ave., near DES PLAINES, ILL. Ekroth Martorano & Ekroth, 343 S. Dearborn St., Chicago, 4, Ill., archts.

Ernst State, East River Rd., Des Plaines, Ill., Own Forces, **$750,000,** 25 HOMES in Barrington, GLENVIEW, ILL.

▲ **N. H. Engle & Sons Inc.,** 2601 Peterson Rd., Chicago, Ill. Own Forces, **$1,300,000,** 125 HOMES near GRAYS LAKE, ILL.

▲ **Homestead Constr. Co.,** 7633 W. 63 St., Summit, Ill. Own Forces, **$1,200,000,** 125 HOMES near SUMMIT, ILL. John Townsend, 11650 Longwood Ave., Chicago, archt.

▲ **T. S. Willis,** Janesville, Wis., LB, **$2,069,000,** general contract High SCHOOL, JANESVILLE, WIS. Bd. Educ., Janesville, Wis. Bids Jan. 28. CD 11/24.

▲ **O. W. Burke Co.,** 1032 Fisher Bldg., Detroit, Mich., CA, **$2,344,509.** 1 story GLASS PLANT addn., alterations, DEARBORN, MICH. Ford Motor Co., 3000 Schaefer St., Dearborn, Mich. Bids Jan. 22. CD 1/18.

Brant-Correll, Inc., 5935 Grand River St., Detroit, Mich. CA Est. **$300,000. FINE ARTS BLDG. extensive** alteration, imprvs., Woodward Ave., DETROIT, MICH. Detroit Institute Fine Arts, 5200 Woodward Ave., Detroit, Mich. Bids Nov. 25. CD 11/17.

▲ **Campbell Constr. Co.,** 9301 Michigan Ave. Detroit, Mich., LB, **$881,881,** general contract,

Peter Eddy & Son, 5929 Horgey St Dearborn, Mich., LB, **$310,000,** mechanical work;

Ernest B. Arvesen, Inc., 25451 Grand River St., Detroit, Mich., LB, **$109,465,** electrical work for WAREHOUSE and ADMINISTRATION UNIT Dix and Southfield St., for Liquor Control Commission, LINCOLN PARK, MICH. State, A. N. Langius, dir. State Bldg. Dpt., 500 S. Walnut St., Lansing, Mich. Bids Feb. 3. CD 1/14.

WEST OF MISSISSIPPI

BIDS ASKED—HEAVY CONSTRUCTION

Minn., Richfield (P.O. Minneapolis)—B.A. 2/23—Village, P. H. Haugen, furnish, install 69,000 lin. ft. 9 in. V.S.P., Proj. 224-1; 101,000 lin. ft. 9 in. V.S.P. Proj. 224-2. G. M. Orr Eng. Co., 1004 Marquette Ave., Minneapolis, engr. CD 10/29.

† **Arkansas**—B.A. 2/24—U. S. Eng., P.O. Box 60, Vicksburg, Miss., Arkansas River Bank Stabilization Works Revetment and Pile Dike construction, Item DR-81.0 R, New Gascony Reach, Trulock, Jefferson Co.

† **Wyoming and Nebraska**—B.A. 3/2—Bureau Reclamation, Reclamation Center, P.O. Box 280, Casper, Wyo., Dry Spotted Tail Creek and Tub Springs Creek Diversion Dams, North Platte Project, Spec. 703C-329; adv. ENR 2/18.

BIDS ASKED—BUILDINGS

▲ **Minn., Hopkins**—SCHOOL—B.A. 2/25—Bd. Educ., R. B. Child, clk., high school $3,000,000. Plans deposit $50. Extended date. Bissell & Belair, 1111 Nicollet Ave., Minneapolis, archts. CD 1/12.

Tex., Amarillo—GRAIN ELEVATOR—Bids Asked—Interstate Grain Co., 1901 E. 3 St., grain elevator. $100,000. CD 12/8.

Tex., Amarillo—GRAIN ELEVATOR—Bids Asked—Kearns Grain & Seed Co., Inc., 1710 Johnson St., 200,000 bu. grain elevator. $100,000. CD 2/3.

Tex., Amarillo—GRAIN ELEVATOR—Bids Asked—Pullman Wheat Growers, Inc., Amarillo. 200,000 bu. grain elevator. $110,000. CD 2/3.

Tex., Irving—WAREHOUSING or STORAGE, etc.—Bids Asked—H. L. Darr, 1135 S. Lamar St., Dallas, warehousing or storage, $150,000; heavy equipment and machinery plant, $250,000. CD 2/3.

Tex., Smiley—GRAIN ELEVATOR—Bids Asked—Manford Hatchery & Feed Co., Inc., Yoakum and Smiley, public grain elevator and storage sys. $100,000. CD 2/3.

SOON LETS CONTRACT—BUILDINGS

Tex., El Paso—TRAINING CENTER—General Motors Corp., c/o Argonaut Realty Div., General Motors Bldg.,

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Detroit, Mich., soon lets contract 1 story masonry, steel retail agency training center. $250,000. Wyatt C. Hedrick, 1200 T & P Passenger Bldg., Fort Worth, engr.-archt. CD 9/22.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

City, Mrs. A. Finkle, clk., City Hall, Minneapolis, Minn., Own Forces, **$175,000,** about 3½ mi. 6- to 24-in. c.i. water mains in various parts of MINNEAPOLIS, MINN. E. Johnson, City Hall, Minneapolis, Minn. Water Dpt. Suprv. CD 3/28/45.

Geraldine Twitty & Earl Ferrell, c/o Delta Drive-in Theater, and P.O. Box 376, Sikeston, Mo. Separate Contracts. **$60,000.** 350-car drive in theater, 1 mi. from EAST PRAIRIE, MO.

OKLAHOMA—State Hy. Dpt., Capitol, Oklahoma City,

Oklahoma Paving Co., 4131 N. Portland St., Oklahoma City 12, Okla., CA **$115,962,** est. $140,021, bridge over Pryor Creek on Hy. 69, Pryor, Mayes Co. Bids Feb. 2, awarded Feb. 3. CD 1/25.

OKLAHOMA—State Hy. Dpt., Capitol, Oklahoma City, Zone 5,

Park Ward Co., Commerce Exchange Bldg., Oklahoma City, Okla., CA **$173,290,** est. $249,225, 1.94 mi. asph. stabil. base and single bit. surf., Medford, Grant Co.; CA **$141,173,** est. $201,952,, 7.51 mi. stabil. aggregate base and double bit. surf., Apache, Caddo Co.;

Montgomery Paving Co., 300 S. Indiana St., Oklahoma City 3, Okla., CA **$206,015,** est. $291,464, 7 mi. b. conc. wid'n and resurf. Hy. 77, Lexington, Cleveland Co.;

Sawallisch Constr. Co., El Reno, Okla. CA **$147,535,** est $204,229 7.7 mi. grade and drainage, Hy. 33, Butler, Custer Co. Grand total $668,013. Bids Feb. 2. CD 1/25.

Honnegar Bros., Kingfisher, Okla., CA **$37,088,** est. $41,700, earth fill dam for a fishing lake near Hollis, Harmon Co., OKLAHOMA. State Game & Fish Dpt., Capitol, Oklahoma City, Okla. E. H. Durkee, Norman, Okla., engr. Awarded Feb. 1.

Acme Constr. Co., Bethany, Okla., CA **$109,868,** est. $116,800, 2.2 mi. 14 in. flow line and pump station, Sect. B;

Long Constr. Co., Morris, Okla., CA **$143,030,** est. $184,600, earthen dam and appurtenances on Washington Creek, Sect. A, PAULS VALLEY, OKLA. City, Pauls Valley, Okla. Bids Feb. 1, awarded Feb. 3. CD 1/11.

Hill Country Telephone Co-operative, Fredericksburg, Tex. Force Account, last of rural pole telephone line expansion **$75,000,** Kerrville, Kerr Co.; **$85,000,** Fredericksburg, Gillespie Co.; **$110,000,** Mason, Mason Co., TEXAS. Grand total $270,000. CD 8/20.

Southwest Texas Electric Co-operative, Eldorado, Tex. Force Account. **$110,000,** some addnl. expansion of rural lines and sys. imprvs., Eldorado, Schleicher Co., TEXAS. CD 1/8/53.

Ericson Constr. Co., Box 1[illegible]57, Spur, Tex., LB **$179,401,** est. $150,000, 7 mi. 69 KV transmitter line and 3750 KV and one 5,000-KVA package type substation, Hereford, TEXAS. Deaf Smith County Electric Co-operative, Hereford, Tex. Bids Jan. 28. CD 1/21.

Sam Houston Electric Co-operative, Livingston, Tex. Purchase and Hire. **$115,000,** line sys. imprvs., Polk Co., TEXAS. CD 8/27/52.

Five Area Telephone Co-operative, Earth, Tex. and c/o W. R. Damon, Circleback, Tex. Force Account. **$125,000.** some addnl. rural pole telephone lines, Lamb Co., TEXAS. CD 1/22/53.

City, City Hall, Corpus Christi, Tex., Purchase and Hire. **$90,000,** some imprvs. to storm sewer lines, CORPUS CHRISTI, TEX. CD 11/30.

City, Liberty, Tex., Force Account. **$65,000,** concrete curbs and gutters, LIBERTY, TEX. CD 5/17/51.

S. E. Lanier Constr. Co., Haskell, Tex., LB **$39,974,** est. $35,000. 6- to 10-in. c.i. water lines, SLATON, TEX. City, Slaton, Tex. Bids Feb. 1. CD 1/25.

▲† **Thayn Constr. Co.,** 2670 Berkeley Circle, Salt Lake City, Utah, LB **$4,088,350,** est. $5,048,100 constr. Missouri Diversion Dam, Missouri River Basin Proj. Spec. DC-4095, MONTANA. Bureau Reclamation, Region 6, P.O. Box 2139, Billings, Mont. Bids Feb. 1. CD 1/25.

BUILDINGS

LOW BIDS AND CONTRACTS

City, Mrs. A. Finkle, Clk., City Hall, Minneapolis, Minn. Own Forces, **$150,000,** WAREHOUSE for City Water Dpt., at E. Hennepin Ave. and Fifth Ave. S.E., MINNEAPOLIS, MINN. E. Johnson, City Hall, Minneapolis, Minn., Water Dpt. Superv.

Standard Constr. Co., 250 Builders Exchange Bldg., Minneapolis, Minn. LB **$839,765.** Hazel Park Junior High School at White Bear Lake Ave. and Maryland St., ST. PAUL, MINN. Bd. Educ., F. E. Conner, J. LaSala, 253 City Hall, city purch. agt., St. Paul, Minn. Bids Jan. 26. CD 1/4.

Weeks Constr. Co., 1814 Harrison St., Kansas City, Mo., CA, **$400,000,** remodeling CHURCH, INDEPENDENCE, MO. Reorganized Church of Jesus Christ of Latter Day Saints, Independence, Ia. Bids Oct. 1. CD 9/9.

▲ **J. E. Dunn Constr. Co.,** 927 Holmes St., Kansas City, Mo. Owner Builds, **$2,250,000,** APARTMENT DEVELOPMENT, 67 and Belinder Rd., KANSAS CITY, MO.

J. E. Williams Constr. Co., 6490 Page Ave., St. Louis 14, Mo. CA Est. **$100,000.** 1 story, 136x200 ft., brick STORAGE BLDG., 301 Prospect St., ST. LOUIS, MO. Falstaff Brewing Corp., 3615 Olive St., St. Louis 8, Mo. O. W. Stiegemeyer, 3 Sheraton Dr., Ladue 24, Mo., archt.

D. D. Layton Constr. Co., Braniff Bldg., Oklahoma City, Okla., CA. Approx. **$300,000.** OFFICE, N. W. 5th and Harvey Sts., OKLAHOMA CITY, OKLA. Home Mortgage & Investment Co., Liberty Bank Bldg., Oklahoma City, Okla. Bids Dec. 17, awarded Jan. 22. CD 11/27.

▲ **Frances Constr. Co.,** 4602 Hartford St., Tulsa, Okla. Purchase and Hire. **$2,000,000.** 150 HOUSES in Suburban Acres, 46 and Hartford Sts., TULSA, OKLA. Awarded Feb. 1.

Carpenter Bros., 1335 Plowman St., Dallas, Tex., LB **$549,940.** EDUCATIONAL BLDG., DALLAS, TEX. First Presbyterian Church, 407 S. Harwood St., Dallas, Tex. Bids Jan. 28. CD 1/5.

National Industries Corp., 1st. Natl. Bank Bldg., Dallas, Tex. Purchases, Day Labor. **$219,500.** masonry, steel, concrete industrial PLANT, FARMERS BRANCH, TEX. CD 8/31.

Brown & Root, Inc., General Contractors, Box 3, Houston, Tex., CA Approx. **$750,000.** addnl. PLANT proper and allied constr., GAINESVILLE, TEX. National Supply Co., Gainesville, Tex. CD 9/2.

▲ **Linbeck Constr. Corp.,** Box 13007, Houston, Tex., LB **$1,201,500.** 6 story, bsmnt. penthouse, OFFICE, HOUSTON, TEX. Old National Insurance Co., 2505 Travis St., Houston, Tex. Bids Jan. 28. CD 1/20.

Swift & Co., 1102 Commerce St., Houston, Tex. Own Forces. **$88,500,** addnl. cottonseed STORAGE unit; **$93,135,** wholesale storage unit; Approx. **$100,000,** addnl. plant food mfg. unit, HOUSTON, TEX. Grand total $281,635. CD 1/14.

Southwestern Building Co., 3065 Golfcrest St., Houston, Tex., CA **$336,500,** four bldgs. for total 48 APARTMENT UNITS, HOUSTON, TEX. Baron Development Corp., c/o Harry W. Freeman, Sterling Bldg., Houston, Tex. CD 1/14.

Houston Hill, Inc., 307 S. Marienfield St., Midland, Tex., LB **$313,431,** general constr. Elementary SCHOOL No. 1, 1 story, 27x137 ft. elementary school, 72x137 ft. cafeteria, 76x137 ft. concrete play area, two 27x190 ft. wings, and San Jacinto HIGH SCHOOL addn., steel frames, masonry exterior walls, etc. concrete fdns., MIDLAND, TEX. Midland Independent School Dist., Midland, Tex. Joe Bill Pierce & Assocs., 603 W. Texas St., Midland, Tex. archts. L. McKay, 1009½ Texas St., Lubbock, and Wilbur Evans, Midland, Tex., engrs. Bids Feb. 2.

W. H. Barnes Co., 1418 W. Hildebrand St., San Antonio, Tex. Own Forces. **$348,000.** 24 frame, masonry DWELLINGGS, concrete slab fdn., SAN ANTONIO, TEX. CD 1/14.

A. L. Rayford, Tyler, Tex. Owner Builds. **$109,000.** motor repair SHOP, TYLER, TEX. CD 1/18.

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FAR WEST

BIDS ASKED—BUILDINGS

† **Calif., Pasadena**—PROPELLANT FACILITIES—B.A. 2/26. U. S. Eng., 751 S. Figuero St., Los Angeles, propellant facilities at jet propulsion laboratory, ENG-04-353-54-38, $600,000. CD 1/8.

Calif., Covina—HOSPITAL—B.A. 3/3—Inter-Community Hospital, 275 W. College St., 2 story, 100-bed, rein.-con. hospital addn. **$530,000.** J. Dewey Harnish, 222 E. "B" St., Ontario, Calif., archts. CD 12/11/51.

Calif., Torrance—SCHOOL—B.A. 3/5—Torrance Unified School Dist., 2335 Plaza Del Amo, rein.-con. Crenshaw Elementary School. $300,000. Schreiber & Peterson, 2380 Atlantic Blvd., Los Angeles, archts. CD 6/10.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

† **Roller-Smith Corp.**, 1000 8th Ave., Bethlehem, Pa., CA **$33,659.** 480-volt power center, The Dalles Dam, Wasco Co., CIVENG-35-026-54-71, OREGON. U. S. Eng., Pittock Block, Portland, Ore. Bids Feb. 2, awarded Feb. 2. CD 12/28.

W. F. Larned, Moses Lake, Wash., LB **$299,951.** 234 mi. telephone line, Benton and Lincoln Counties, OREGON. Pioneer Telephone Co-operative, Philomath, Ore. Bids Feb. 2. CD 1/21.

Beason Constr. Co., Box 109, Escondido, Calif., LB, **$104,414**, installing 15,570 ft. sanitary sewer mains, CHULA VISTA, CALIF. City, 276 Guava Ave., Chula Vista, Calif. Bids Feb. 2.

Elledge Brothers, Rt. 1, Box 5, Coachella, Calif., LB, **$134,854**, installing 20-in. steel concrete lined and coated water lines, LA HABRA, CALIF. City, 201 E. Erna Ave., La Habra, Calif. Moffatt & Nichol, Inc., 122 W. 5 St., Long Beach, Calif., engrs. Bids Feb. 2. CD 5/22/52.

BUILDINGS

LOW BIDS AND CONTRACTS

McDonald Bros., 2620 N. Rosemead St., El Monte., Calif., Owner Builds. **$300,000**, 50 frame, stucco DWELLINGS, Beryl Dr., Planz Rd., Tract 1621, BAKERSFIELD, CALIF.

▲ **C. F. Braun & Co.**, 1000 S. Fremont Ave., Alhambra, Calif., LA, **$2,500,000**, nitric acid and ammonium nitrate PLANT, BREA, CALIF. Brea Chemicals, Inc., Brea, Calif., subsidiary of Union Oil Co. of California, 617 W. 7 St., Los Angeles, Calif.

The Commodore Co., 9838 Belmont Ave., Bellflower, Calif., CA, **$838,300**, 83 frame, stucco DWELLINGS, El Paseo St., Los Santos and Paltez Ave., LAKEWOOD, CALIF. Birch, Yrecca, Varwood, Underwood, Wimplewood Homes, Inc., 9838 Belmont Ave., Bellflower, Calif.

Wohl-Calhoun Co., 845 N. Highland Ave., Los Angeles, Calif., CA, **$130,000**, 34,000 sq. ft. tilt-up concrete WAREHOUSE, LOS ANGELES, CALIF. Pacific Can Co., 290 Division St., San Francisco, Calif. Ellison & King, 1045 Sansome St., San Francisco, Calif., engrs.

James E. Fuller, 3465 Encina Ave., Oakland, Calif., CA, 17,000 sq. ft., tilt-up MACHINE SHOP, WAREHOUSE and OFFICE, OAKLAND, CALIF. Straub Mfg., c/o John N. Sardis, structural engr., 347 Clay St., San Francisco, Calif. Awarded Jan. 28.

Harvey A. Nichols Co., 926 E. Slauson Ave., Los Angeles, Calif., CA, **$618,223**, JUVENILE HALL, RIVERSIDE, CALIF. Riverside Co., Court House, Riverside, Calif. Bids Jan. 20, awarded Feb. 2. CD 1/27, under LB.

Stolte, Inc., 1541 N. Foothill Blvd., Pasadena, Calif., LB, **$785,000**, COUNTY WELFARE BLDG., SANTA ANA, CALIF. Orange Co., 600 N. Broadway, Santa Ana, Calif. Bids Feb. 2. CD 12/16.

CANADA

BIDS ASKED—BUILDINGS

▲ **Ont., Hamilton** — SCHOOL — B.A. 2/24 — **Bd. Educ.**, 367 Hunter St. W., 2 story U-shaped, high school, Over $1,000,000. Prack & Prack, 310 Main St. E., archts. CD 2/19.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

Canadian Bridge Co., Walkerville, Ont., CA, **$446,994** superstructure for 310 ft. steel bridge, CHATHAM, ONT. City Council, Mayor W. A. Donovan, Chatham, Ont. Bids Jan. 30, awarded Feb. 2. CD 1/21.

Canadian General Electric Co. Ltd., 212 King St., Toronto, Ont., CA, **$500,000** television station, King Street West, KITCHENER, ONT. Central Ontario Television Ltd., 39 Edward St., Kitchener, Ont. C. A. Pollock, c/o owner, engr.

J. E. Copeland Co. Ltd., Montreal Rd., Ottawa, Ont., CA, **$65,000**, terminal bldg. addn., Uplands Airport, OTTAWA, ONT. Dpt. Transport, Ottawa, Ont. CD 12/2.

Ruscica Brothers Ltd., 41 Industrial St., Toronto, Ont., CA, $300,000, water mains, sewers;

Leaside Contg. Co. Ltd., Densley Rd., Weston, Ont. CA, $250,000, water mains and sewers in section of Don Mills Development, TORONTO, ONT. Don Mills Development Ltd., Donalda House, York Mills, Toronto, Ont. CD 3/18, under Commercial Buildings.

Schwenger Constr. Ltd., 1255 Beach Rd., Hamilton, **Ont.**, CA, **$150,000**, sewage treatment plant addn. in suburban development, TORONTO, ONT. Don Mills Development Ltd., Donalda House, York Mills, Toronto.

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Ont. King, Couns Ltd., 8 Bedford Rd., engrs. CD 3/18, under Commercial Buildings.

Foundation Co. of Canada Ltd., 1220 Bay St., Toronto, Ont., CA, **$175,000** foundation piling, alterations to dock wall and other substructure work for new transit shed on Toronto Harbor on Queen's Quay east of Yonge St., TORONTO, ONT. Toronto Harbor Comm., 60 Harbor St., Toronto, Ont. Awarded Feb. 1. CD 5/29/52.

BUILDINGS

LOW BIDS AND CONTRACTS

Louis Fecteau, 104 St. Jean St., Quebec City, Que., CA, **$550,000**, 45-bed, 2 story, 50x180 ft. HOSPITAL, PERTH, N. B. Hospitalieres de St. Joseph, Vallee Lourdes, N. B. Belanger & Roy, 9 Bridge St., Edmundston, N. B., archts.

Finley W. McLachlan Ltd., 195 Fairbank Ave., Toronto, Ont. CA, **$500,000**, 1 story, 184x310 ft., concrete block, steel, brick FACTORY, BRANTFORD, ONT. Williams Tool Corp. Ltd., 32 Bridge St., Brantford, Ont. Awarded Feb. 1.

▲ **A. E. Rule Ltd.**, 451 Victoria Park Ave., Toronto, Ont., CA, **$1,040,000**, 1 story, 500x600 ft., brick, concrete WAREHOUSE, Rexdale Blvd. near Highwy 27, TORONTO, ONT. White Hardware Ltd., 10 Alcorn Ave., Toronto, Ont. N. A. Armstrong, 19 Melinda St., Toronto, Ont., archts.

▲ **Gaston Ouellette & Co. Ltd.**, 6881 20 Ave., Rosemount, Que., CA, **$2,000,000**, 150 HOUSING DEVELOPMENT on new streets near Blvd. Cure Labelle, L'ABOARD A PLOUFFE, QUE. D. G. Woods, c/o contractor, archt.

Gerard Gigiuc, 6882 De Normanville St., Montreal, Que., CA, **$700,000**, 70 HOUSES, St. Jacques St. Henri and St. Germain Sts., ST. VINCENT DE PAUL, QUE. J. Damphousse, 1459 Belanger St. E., Montreal, Que., archt.

Desourdy Constr. Ltd., P. O. Box 700, Cowansville, Que., CA, **$600,000**, 100-bed, concrete, steel, brick HOSPITAL, SWEETSBURG, QUE. Municipality, Sweetsburg, Que. CD 6/19/51.

Proposed Projects

WATER SUPPLY

Ala., Morris—Town, Town Hall, WW sys. **$150,000.** J. W. Goodwin Eng. Co., 2111 7 Ave., Birmingham, consult. engr.

Fla., Atlantic Beach—City, WW imprvs. **$125,000.** Russell & Axon, Municipal Airport, Daytona Beach, consult. engrs.

Fla., Branford—City, WW imprvs. **$175,000.** Briley, Wild & Assocs., 8 N. Wild Olive Ave., Daytona Beach, consult. engrs.

Fla., Cocoa—City, water main exten. **$200,000.** Reynolds, Smith & Hills, 227 Park St., Jacksonville, consult. engrs.

Fla., Fort Walton—City, City Hall, WW imprvs. **$150,000.** R. L. Kenan & Assocs., Inc., 272 Brent Bldg., Pensacola, consult. engr.

Fla., Jacksonville Beach—City, WW imprvs. **$100,000.** Smith & Gillespie, P.O. Box 4817, Jacksonville consult. engrs. CD 2/4/49.

Fla., Palatka—City, WW imprvs. **$150,000.**

▲ **Fla., Panama City**—Bay Co., Court House, WW imprvs. **$1,000,000.** J. B. Converse & Co., 106 St. Joseph St., Mobile, Ala., consult. engrs.

Fla., St. Cloud—City, WW imprvs. **$450,000.** Briley, Wild & Assocs., 8 N. Wild Olive Ave., Daytona Beach, consult. engrs. CD 12/15.

Ga., Calhoun—City, WW imprvs. **$150,000.** Wiedman & Singleton, P. O. Box 1878, Atlanta, consult. engrs. CD 11/17.

Ga., Decatur—DeKalb Co., Court House, 1 m.g. water tank, etc., **$750,000.** Robert & Co. Assocs., 96 Poplar St. N.W., Atlanta, consult. engrs.

▲ **Ill., Northlake**—City, water reservoirs, sewers, **$1,500,000.** Consoer, Townsend & Assocs., 351 E. Ohio St., Chicago, Zone 11, consult. engrs.

▲ **Ky., Louisville**—Louisville Water Co., 4 Third St., coagulating basin on site of Crescent Hill swimming pool. **$1,500,000.** Alvord, Burdick & Howson, 20 N. Wacker Dr., Chicago, Ill., consult. engrs. CD 11/23/51.

Minn., Ranier—Village, V. Larson, mayor, water main expansions and 2 mi. water supply line from International Falls. **$125,000.** R. J. Ellison, 635 N. Cleveland Ave., North St. Paul, consult. engr.

▲ **Nev., Las Vegas**—Las Vegas Valley Water Dist., 900 S. 5 St., 17 mi. 30 and 36 in. concrete pipe line. **$2,500,000.** James M. Montgomery, 15 N. Oakland Ave., Pasadena, Calif., consult. engr. CD 10/5.

N. H., Concord—City, office of City Manager., City Hall, water exten., River Rd. Sect., **$50,000;** Black Hill Sect., **$100,000.**

N. C., Rocky Mount—City, WW imprvs. **$100,000.** Pierson & Whitman, Security Bank Bldg., Raleigh, consult. engrs.

N. C., Scotland Neck—City, WW imprvs. **$100,000.** Linberg Engineers, Burlington, consult. engrs.

N. C., Valdese—City, WW imprvs. **$110,000.** W. K. Dickson & Assocs., 404½ S. Tryon St., Charlotte, consult. engrs. CD 1/27.

N. C., West Monroe—City, WW imprvs. **$175,000.** Paul M. Van Camp, Southern Pines, consult. engr.

S. C., Ellenton—Town, WW sys. **$200,000.** Patchen & Zimmerman, 525 Telfair St., Augusta, Ga., consult. engrs.

Tenn., Maryville—City, WW imprvs. **$250,000.** Howard K. Bell Co., 553 S. Limestone St., Lexington, Ky., consult. engr.

Tenn., Newport—City, WW imprvs. **$100,000.** L. J. Warren, P.O. Box 7163, Asheville, N. C., consult. engr. CD 7/2/47.

Tenn., Oliver Springs—Town, WW imprvs. **$240,000.** James E. MacDonald, 1402 N. Broadway, Knoxville, consult. engr. CD 1/27.

Tenn., St. Bethlehem—St. Bethlehem Utility Dist., St. Bethlehem, WW imprvs. **$140,000.** King & Clark, 410 Madison St., Clarksville, consult. engrs.

Tenn., Springhill—City, WW sys. **$100,000.** J. Sanders Parker, 816 8th Ave. S., Nashville, consult. engr. CD 12/3/46.

▲ **Tex., Fort Worth**—City, City Hall, voted bonds Jan. 26, water supply, **$1,000,000;** water storage, **$750,000;** water distr. lines, laterals, **$1,500,000;** c.i. water mains, **$2,000,000;** addnl. misc. WW sys. imprvs. rehabilitation, **$4,750,000.** CD 1/11.

Va., Arlington—Arlington County Court House, Arlington, one 9 m.g. **$780,000** and one 3 m.g. **$130,000** water storage reservoirs. Alexander Potter Assocs., 50 Church St., New York, N. Y., consult. engrs. CD 11/6.

Wash., Seattle—City, County-City Bldg., Seattle, Zone 4, 30 in. supply main in E. 185 St. from Aurora Ave. to 5 Ave. N.E. **$120,000.** R. W. Morse, water supt. CD 10/19/50.

Alta., Lethbridge—City, City Hall, replacing 13,871 ft. wooden mains, **$110,000.**

▲ **Ont., London**—Public Utilities Comn., V. A. McKillop, mgr., water treatment plant and pumping station at Fanshawe Lake, **$1,200,000;** extensions **$1,690,000,** incl. 24 in. feeder main on Commissioners Rd., main to Huron St. and extension to Dundas St. J. F. MacLaren & Assocs., 705 Yonge St., Toronto, consult. engrs. CD 1/27.

▲ **Ont., Toronto**—Municipality of Metropolitan Toronto, 67 Adelaide St. E., Toronto, Gore & Storrie, engrs., 1130 Bay St., recommend in report WW system expenditures over period of years to bring system up-to-date. **$45,380,000.** CD 1/22.

SEWERS, WASTE DISPOSAL

Ala., Auburn—City, City Hall, sewage treatment plant. **$300,000.** Polglaze & Basenberg, 812 S. 27 St., Birmingham, consult. engrs.

Ala., Irondale—Town, sanitary sewerage imprvs. **$130,000.** J. W. Goodwin Eng. Co., 2111 7 Ave. S., Birmingham, consult. engr.

Calif., Stanton—Stanton County Water District, Stanton, voted **$190,000** bonds, sewer facilities. CD 1/8.

(Continued on page 252)

Anthony Company
Brantford Coach & Body, Ltd.
Daybrook Hydraulic Corp.
Galion All Steel Body Co.
Gar Wood Industries, Inc.
The Heil Company
Hercules Steel Products Corp.
Marion Metal Products Co.
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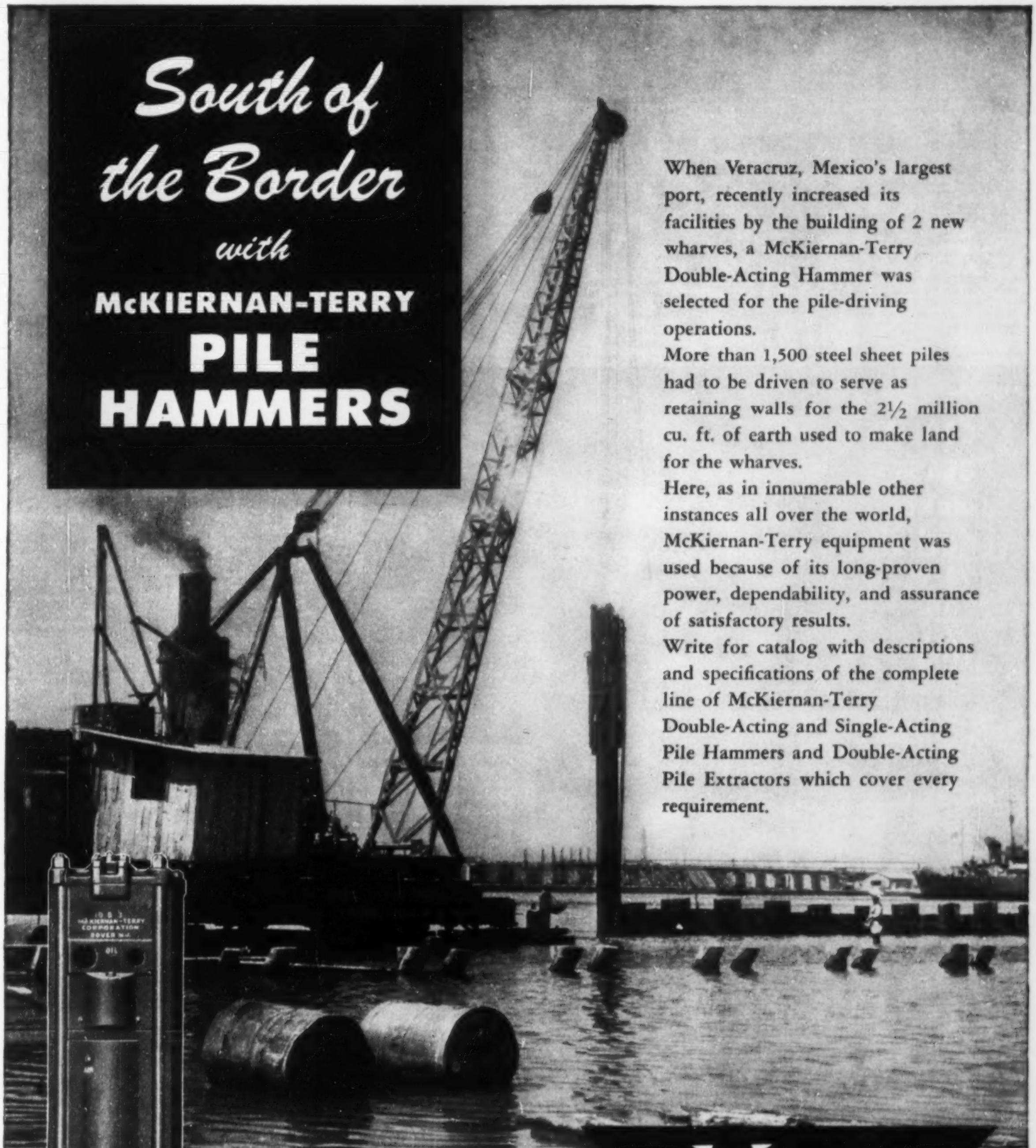

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MK 349

(Continued from page 250)

Fla., **Apalachicola**—City, sewage disposal plant. $200,000. R. L. Kenan & Assocs., Brent Bldg., Pensacola, consult. engr.

Fla., **Atlantic Beach**—City, sewage plant and collection system. $400,000. Russell & Axon, Municipal Airport Daytona Beach, consult. engrs. CD 11/33.

Fla., **Cocoa**—City, City Hall, sanitary sewerage imprvs. $200,000. Reynolds, Smith & Hills, 227 Park St., Jacksonville, consult. engrs. CD 1/23/52.

Fla., **Crestview**—City, City Hall, sanitary sewerage imprvs. $100,000. John J. Harte Co., 284 Techwood Dr. N.W., Atlanta, Ga., consult. engr.

▲ Fla., **Hollywood**—City, sanitary sewers and treatment plant, Over $3,000,000. Smith & Gillespie, P.O. Box 4817, Jacksonville, consult. engrs. CD 12/15.

Fla., **Jacksonville Beach**—City, sanitary sewerage imprvs. $150,000. Smith & Gillespie, P.O. Box 4817, Jacksonville, consult. engrs. CD 2/4/49.

Fla., **Key West**—City, incinerator. $300,000. Clifford-Cooper & Assocs., 101 Westward Dr., Miami Springs, consult. engrs.

Fla., **Ormond Beach**—City, storm sewers. $420,000. Harold Briley, City Hall, city engr.

Fla., **Starke**—City, sanitary sewer imprvs. $100,000. Robert M. Angas, 308 W. Adams St., Jacksonville, consult. engr.

Ga., **College Park**—City, sanitary sewers Live Oak Gardens Section. $115,000. Wiedeman & Singleton, P.O. Box 1878, Atlanta, consult. engrs.

Ga., **Smyrna**—City, sewage disposal plant. $225,000. Wiedeman & Singleton, P.O. Box 1878, Atlanta, consult. engrs. CD 12/21.

Ind., **Dunkirk**—City, sewage plant. $350,000 or more. Paul White, Muncie, consult. engr. CD 12/28.

Mich., **Algonac**—Village, sewage disposal plant, treatment facilities. $600,000. Pate & Hirn, 532 Michigan Bldg., Detroit, consult. engrs.

Mich., **Grand Rapids**—City, 3.5 mi. sanitary sewers, various sections. $100,000. Millard M. Moore, City Hall, city engr. CD 6/20/52.

Mich., **Holly**—Village, sewage disposal plant, sewage treatment facilities. $175,000. CD 10/2/46.

Minn., **International Falls**—City, V. Peterson, clk., storm sewers, sewage treatment plant, $300,000. R. J. Ellison, 635 N. Cleveland Ave., St. Paul, consult. engr. CD 5/20/46.

Minn., **Minneapolis**—City, Mrs. A. Finkle, clk., storm drains in 52 Ave. north between Lyndale and Irving Aves. 9 blocks; 51 Ave. north between Lyndale and Girard Aves. 8 blocks; 50 Ave. north between Lyndale and Girard Aves. 8 blocks; Lyndale Ave. north between 50 and 52 Sts. 2 blocks, $186,000. H. Erickson, city engr.

Minn., **Wells**—Village, B. F. Bartholomew, clk., sewage treatment plant. $200,000. Banister Eng. Co., 1549 University Ave., St. Paul, engr.

Mo., **St. Louis County**—Melrose Sewer Dist., Bd. Trustees, I. G. Phillips, mgr., 4625 Ravenwood Ave., St. Louis, Zone 20, completing storm sewer drainage sys., sanitary sewerage sys. in district, $330,000. George Kropp & Assoc., 8025 Forsyth Blvd., Clayton, Zone 24, consult. engrs. CD 1/20.

N. C., **Cary**—Town, sewage disposal plant, sewer lines. $100,000. Moore, Gardner & Assocs., Asheboro, consult. engrs.

N. C., **Lenoir**—City, sanitary sewer imprvs: $200,000. Piatt & Davis, Corcoran Bldg., Durham, consult. engrs.

N. C., **Raleigh**—City, City Hall, Walnut Creek and Crabtree Sewage disposal plant. $1,250,000. Wm. C. Olsen, 5 Exchange Pl., consult. engr. CD 2/7/51.

N. C., **Rocky Mount**—City, sanitary sewer imprvs. $100,000. Pierson & Whitman, Security Bank Bldg., Raleigh, consult. engrs.

N. C., **Scotland Neck**—City, sanitary sewer imprvs. $200,000. Linberg Engineers, Burlington, N. C., consult. engrs.

N. C., **White Lake**—Town, sanitary sewer imprvs. $100,000. Paul M. Van Camp, Southern Pines, consult engr.

S. C., **Bamberg**—City, sanitary sewer imprvs. $175,000 Thomas McCall Eng. Co., 259 Amelia St., Orangeburg, consult. engr.

S. C., **Blacksburg**—City, sanitary sewer imprvs. $100,000. Harwood Beebe Co., 171 Pine St., Spartanburg, consult. engr.

S. C., **Chesnee**—City, sanitary sewage imprvs. $162,970 Harwood Beebe Co., 171 Pine St., Spartanburg, consult. engr.. CD 8/12.

S. C., **Conway**—City, sanitary sewage imprvs. $100,000

Tenn., **Elizabethhton**—City, sewage disposal sys. $375,000. Allen & Hoshall, 65 McCall Pl., Memphis, consult. engrs. CD 2/13/53.

Tenn., **Newport**—City, sanitary sewer imprvs. $200,000 L. J. Warren, P.O. Box 7163, Asheville, N. C., consult. engr.

Tenn., **Rogersville**—City, sanitary sewer imprvs. $450,000. Barnard & Bunk, 1023 Nicholson Dr., Baton Rouge, La., consult. engrs.

Tenn., **South Pittsburg**—City, sanitary sewer imprvs Wallace & Campbell, P.O. Box 318, Knoxville, consult. engrs.

▲ Tex., **Fort Worth**—City, City Hall, voted bonds Jan. 26, Unit 1, sewage disposal, $250,000; Unit 2, sewage disposal, $350,000; Unit 3, sewage disposal, $300,000; sanitary sewer collection lines, $1,750,000; misc. sanitary sewerage sys. imprvs., rehabilitation, $2,350,000. CD 1/11.

Tex., **Houston**—Bob Smith, 2021 Southgate St., storm sewers, $70,000; sanitary sewers, $75,000, Out Westheimer Rd. at Voss Rd., on 158-acre tract.

Tex., **Rockport**—Little Bay Shores, Inc., c/o James H. Sorenson, Jr., Rockport, sanitary sewer lines, $65,000; storm sewers, $65,000, 91-acre tract on Little Bay.

Tex., **San Antonio**—Bellaire Lumber Co., 7903 S. Flores St., concrete sanitary sewers, $75,000; storm sewers, $65,000, Military Hy-Plesanton Rd.

Tex., **San Antonio**—Odie E. Ainsworth, 1170 Kendalia Ave., sanitary sewers, $65,000; storm sewers, $60,000; south of Lackland and Kelly Air Force Bases.

Alaska, **Fairbanks**—City, City Hall, voted bonds Jan. 26, sewers. $600,000. CD 1/4.

▲ Ont., **Toronto**—Municipality of Metroplitan Toronto, 67 Adelaide St. E., Toronto, Gore & Storrie, engrs., 1130 Bay St., recommend in report of sewerage system work expenditures over period of years to bring system up-to-date. $58,910,000. CD 8/10/44.

BRIDGES

KANSAS—State Hy. Comn., Topeka,

Shawnee Co.—bridge over Kaw River and C.R.S. & P.R.R. consisting of 52 ft., 66 ft., 66 ft., 56 ft. continuous steel beam spans, on steel pipe bent piers, 210 ft., 252 ft., 252 ft., 63 ft. continuous deck truss spans, 126 ft. suspended deck truss span and 63 ft., 252 ft., 252 ft., 210 ft. continuous deck truss spans on pedestal piers, 53 ft., 66 ft., 66 ft., 66 ft., 66 ft., 53 ft. continuous steel beam spans on steel pile bent piers, 22 ft. roadway, Proj. No. 89 ER 84, $900,000, Finney & Turnipseed, New England Bldg., Topeka, consult. engrs. W. A. King, Court House, Topeka, co. engr. CD 12/5/51, under Kan., Topeka.

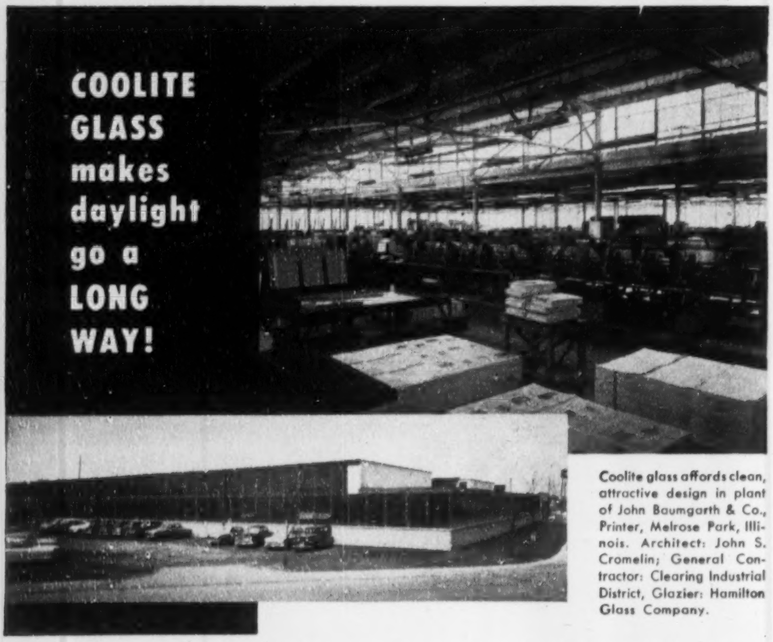
▲ **MASSACHUSETTS**—Commonwealth of Mass., Dpt. P. Wks., 100 Nashua St., Boston,

Salem—grade crossing elimination (1) single track subway to bring Boston & Maine R.R. under Washington St., etc. (2) raising grades on Norman and Mill Sts. (3) wid'n. Canal St. (4) constr. parking area (5) demolish present railroad station (6) constr. dike south shore of North River. $4,000,000. Singstad & Baille, 165 Congress St., Boston, consult. engrs. CD 4/21.

MICHIGAN—State Hy. Dpt., Stevens T. Mason Bldg., Lansing,

Wayne Co.—concrete, steel overpass structure Willow Run Expressway over M-56, Belleville, $500,000. Oscar M. Gunderson, 3800 Cadillac Tower, Detroit, engr.

Minn., New Ulm—Brown Co., C. E. Schmid, aud., four 90 ft., plate girder spans, bridge over Big Cottonwood River, 24 ft. roadway, $200,000. W. K. Johnston Eng. Co., Metropolitan Life Bldg., Minneapolis, consult. engr.



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▲ **Ore., Portland**—Comrs. Multnomah Co., Court House, Portland, **$12,000,000** bond election May 21, constr. Morrison Street bridge, across Willamette River. CD 3/19/45.

▲ **TENNESSEE**—State Hy. Dpt., Nashville,

Roane Co.—bridge over Emory River on Roane St. in city of Harriman. **$1,000,000.**

▲ **Tex., Galveston**—City, City Hall, voted **$6,000,000** bonds Jan. 30, causeway from Galveston Mainland to Pelican Island. Galveston County Navigation Dist. will be created to handle project. CD 1/18.

▲ **WASHINGTON**—State Hy. Comn., Olympia,

Pacific Co.—bridge across South Bay near Bay City. **$1,000,000.**

Ont., Toronto—Metropolitan Corp. of Toronto, 67 Adelaide St. E., rein.-con. bridge, 48 ft. roadway, 6 ft. wide walk on each side at Rogers and Weston Rds., to replace two smaller bridges. **$650,000.** H. C. Rose, c/o owner, comr. of roads. CD 1/23.

STREETS AND ROADS

Calif., El Segundo—City, 203 Richmond St., imprv. Sycamore Ave. and other streets, **$114,098.** Donald R. Short, c/o owner, engr.

Fla., Clearwater—City, City Hall, street imprvs. **$500,000.** Briley, Wild & Assocs., 8 North Wild Ave., Daytona Beach, consult. engrs.

Fla., Crestview—City, street imprvs. **$100,000.** John J. Harte Co., 284 Techwood Dr. N.W., Atlanta, Ga., consult. engr.

Fla., Hialeah—City, street imprvs. **$300,000.** Maurice Connell & Assoc., 200 Langford Bldg., Miami, consult. engrs. CD 2/12.

Fla., North Bay Village (Miami Beach)—Town, 7903 East Dr. N., Miami Beach, street paving, **$200,000.** Shinn & Huchinson, 278 Aragon Ave., Coral Gables, consult. engrs.

Fla., Ormond Beach—City, street imprvs. **$250,000.** Harold Briley, City Hall, city engr.

Ga., Cedartown—City, street imprvs. **$100,000.** J. P. Baskin & Assocs., Rialto Theatre Bldg., Atlanta, consult. engrs.

Ill., Granite City—City, Leonard R. Davis, mayor, City Hall, resurfacing Madison Ave. from 14 to 30 Sts. **$500,000.** CD 4/8/46.

▲ **MASSACHUSETTS**—Commonwealth of Mass., Dpt. P. Wks., 100 Nashua St., Boston,

Kingston-Duxbury—hy. Kingston-Duxbury bypass, **$3,000,000,** Universal Eng. Corp., 150 Causway St., Boston, consult. engrs.

Plymouth-Bourne—Plymouth-Duxbury Bypass hy., **$3,000,000,** Whitman & Howard, 89 Broad St., Boston, consult. engrs.

Revere—Sect. II Northeast Expressway Revere Beach Pkwy. interchange to Cutler Hy. (Newburyport-Turnpike) incl. 6 overpasses and underpasses, **$4,000,000.**

Sect. III Northeast Expressway—easterly connection to Revere Beach to incl. 5 overpasses and underpasses, **$4,000,000,** Parsons Brinckerhoff, Hall & Macdonald, 51 Cornhill St., Boston, consult. engrs.

Mich., Grand Rapids—City, 8.3 mi. c. conc. road surf. **$700,000.** Millard M. Moore, City Hall, city engr. CD 11/13/44.

▲ **NORTH CAROLINA**—State Hy. and P. Wks. Comn., Raleigh,

Forsyth Co.—four-lane express hy. Winston-Salem, **$2,500,000.** Capitol Engr. Co., Church St., Dillsburg, Pa. consult. engr. CD 2/11/52.

N. C., Thomasville—City, street imprvs. **$100,000.**

Tenn., Harriman—City, street imprvs. **$500,000.** Campbell & Wallace, 805 Locust St., Knoxville, consult. engrs.

EARTHWORK, WATERWAYS

Calif., San Jose—Santa Clara County Flood Control & Water Conservation District, 60 N. 2 St. **$390,000** bond election Mar. 19, flood control work in Flood Control Zone SL-3. CD 9/24/52.

▲† **Alaska, Juneau**—U. S. Eng., Anchorage, small boat harbors and jetties at Juneau and across the bay at Douglas, **$1,171,000.**

AIRPORTS

† **Ala., Foley**—AIRFIELD UTILITIES, etc.—Dist. P. Wks. Office, Dpt. Navy, Charleston, S. C. airfield utilities, Barin Field Auxiliary Landing Strip, **$125,000.** J. B. Converse & Co., P. O. Box 1084, Mobile, consult. engr. CD 10/31/51.

† **Calif., Muroc**—SITE ADAPTATION, etc.—U. S. Eng., 751 S. Figueroa St., Los Angeles, site adaptation for relocation of assist takeoff facilities, Edwards Air Force Base, **$295,300,** Aerojet-General Corp., 6352 N. Irwindale St., Azusa, consult. engrs.; bulk fuel storage, Edwards Air Force Base, **$474,300,** Koebig & Koebig, 3142 Wilshire Blvd., Los Angeles, consult engrs. CD 12/10/52.

▲† **Calif., Muroc**—MAINTENANCE HANGAR—U. S. Eng., 751 S. Figueroa St., Los Angeles, heavy bomber maintenance hangar, Edwards Air Force Base. **$1,266,475.** Van Dyke & Barnes, 2234 Beverly Blvd., Los Angeles, consult. engrs. CD 12/10/52.

▲† **Fla., Pensacola**—ACCESS ROADS, etc.—District P. Wks. Office, Dpt. Navy, Charleston, S. C., access roads

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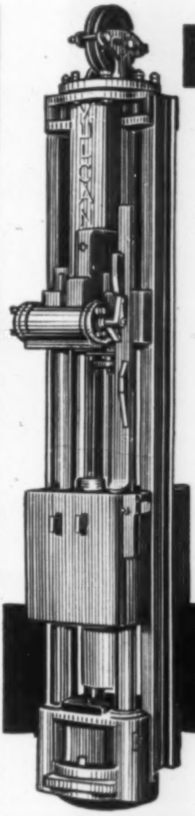

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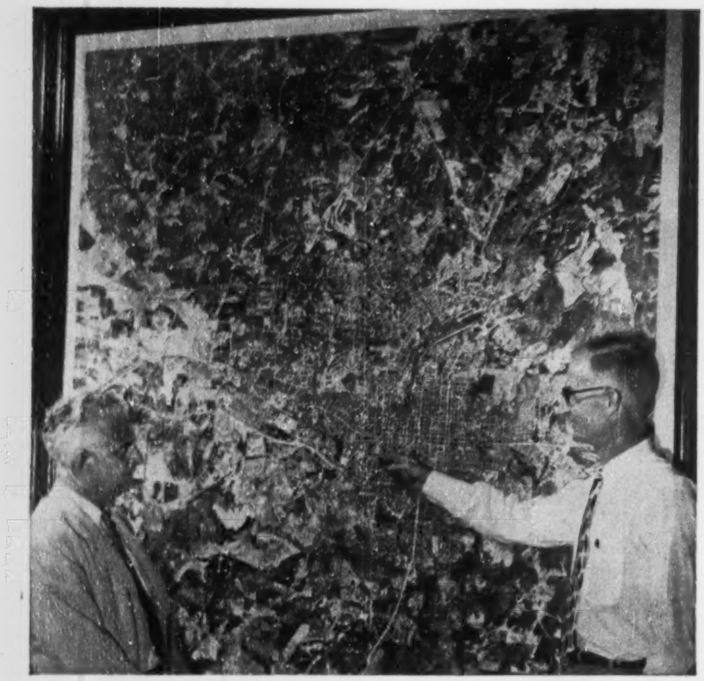

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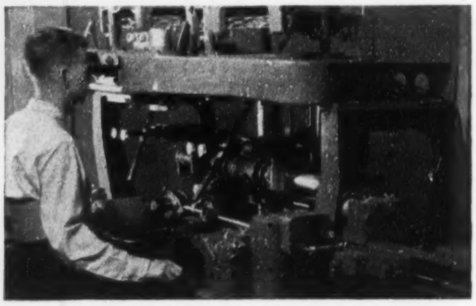

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(Continued from page 253)

and streets, $95,000; WW imprvs., $250,000; water lines, wells $1,000,000; airfield utilities, $150,000, all at Naval Air Station. J. B. Converse & Co., P. O. Box 1084 Mobile, Ala., consult. engrs.

Ind., Peru—AIRPORT—City, S. G. Cox, mayor, airport, $150,000 or more.

Pa., Phila.—CARGO BLDG., etc.—Dpt. Procurement, City Hall Annex, plans by Carroll, Grisdale & Van Alen, 204 W. Rittenhouse Square, air cargo bldg., $300,000, CD 12/22; hangar, Phila. International Airport, $500,000. CD 1/13/50.

▲† R. I., **North Kingston**—TEST CELLS—First Naval Dist., 495 Summer St., Boston, Mass., jet engine test cells, Naval Air Station, Approx. $3,000,000.

Tenn., Knoxville—AIRPORT—Island Aviation Service, c/o E. B. Mills, Wills Pl., airport. $250,000.

LATIN AMERICA

▲ **Mexico**—Sria. de Marina, Mexico City, plans 500-mi. coastal canal, Matamoros-Santo Domingo. $15,780,000.

PUBLIC BUILDINGS

Calif., Gardena — PHYSICS-CHEMISTRY — El Camino Junior College District, 3031 W. Redondo Beach Blvd., plans by Marsh, Smith, Powell, 208 W. 8 St. 1 story, 30,000 sq. ft., rein.-con. physics-chemistry bldg., $450,000; rein.-con. swim gymnasium, $300,000.

▲ **Calif., Long Beach**—EXHIBIT—City, 205 W. Broadway, voted sale of $1,600,000 bonds Jan. 21, exhibit hall, $2,500,000. Kenneth S. Wing, 30 Linden Ave., archt. CD 6/23.

Calif., Los Angeles—SCHOOLS—Bd. Educ., 1425 S. San Pedro St., plans by Bowerman, Hobson & Winter, 21454 Providencia St., Woodland, Hills, multi-purpose bldgs. at Camellia Ave., Chase St., Lorne St., Riverside Dr., Stonehurst Ave. and Woodland Hills Schools. $600,000. CD 6/13/52.

Calif., Monterey—SCHOOL—Monterey City Elementary School Dist., Box 1031, school, in Fort Ord Terrace Area, $550,000. CD 4/3/50.

Calif., Santa Monica—GYMNASIUM, etc.—Santa Monica Unified School District, 1333 6 St., plans by Marsh, Smith & Powell, 208 W. 8 St., Los Angeles, 25,000 sq. ft. gymnasium, shower and locker bldg. $300,000. CD 10/27/50.

▲ **Calif., Westwood**—SCHOOL—Westwood Unified School District, Ray Haskell, supt., Westwood, plans by Clayton Kantz, P.O. Box 1718, Redding, 47,000 sq. ft. Evelyn Walker Junior and Senior High School, $1,060,000.

Calif., Whittier—SCHOOL IMPRVS.—Lowell Joint School Dist., 10711 S. Valley Home Ave., voted $600,000 bonds school imprvs. CD 1/4

▲ **Colo., Trinidad**—HOME—State of Colorado, State Office Bldg., Denver, home for 500 elderly persons, $1,000,000.

Conn., Bridgeport—SCHOOL—City, Bd. Educ., Bridgeport, plans by Toby Vece, 9 Roger Williams Rd., T-shaped, concrete, brick masonry elementary school Eckart St., near Madison Ave. $700,000. CD 2/3/49.

Conn., East Hartford—SCHOOL—Town Bd. Educ., 200 Burnside St., plans by Ebbets, Frid & Prentice, 862 Asylum Ave., Hartford, elementary school, South of Oak and Forest Sts., $300,000.

Conn., Mansfield—GIRL PATIENT—State, R. G. Macy, comr., P. Wks., State Office Bldg., plans by O. C. S. Ziroli, 945 Main St., Bridgeport, 152-bed girl patient bldg., Mansfield State Training School. $650,000. CD 9/19/52.

▲ **Del., Wilmington**—SCHOOL—Millside School Bldg., Comn., 590 School Hill Lane, Millside, Wilmington, plans by W. Ellis Preston, 903 Jefferson St., elementary school, $1,500,000. CD 8/13.

▲ **Del., Wilmington**—TRANSIT SHED, etc.—Bd. Harbor Comrs., Marine Terminal, plans by Harris Dechant & Assocs., engrs. and archts., 123 S. Broad St., Phila., Pa., transit shed and warehouse, $2,300,000.

Del., Wyoming—SCHOOL—Caesar Rodney School District, Wyoming, elementary school and playground, etc. $300,000.

Ind., Greensburg—SCHOOL—School City of Greensburg, W. L. Headlee, pres., Greensburg, plans by Everett I. Born Co., Architects Bldg., Indianapolis, Senior and Junior High School, $800,000. CD 9/12/51.

Ind., Marion—SCHOOL—School City of Marion, Orville Hooker, supt. schools, plans by McGuire & Shook, Fletcher Trust Bldg., Indianapolis, McCulloch School addn. $300,000 or more.

Ky., Louisville—FISCAL COURT—Jefferson County Fiscal Court, plans by Walter Wagner & Joseph Potts, Fincastle Bldg., 4 story, front section and west wing, 9 story to east wing fiscal court addn. also increasing floor space from 64,000 to 117,000 sq. ft., $460,000, E. R. Ronald & Assoc., 554 St. Third St., consult. engrs. CD 6/9.

Me., Hallowell—WAREHOUSE—State Liquor Comm., State House, Augusta, plans by Stanley S. Merrill, 9 Vine St., Auburn, warehouse. $350,000.

Me., Lincoln—SCHOOL—Town, School Dist., plans by Alonzo J. Harriman, Inc., 292 Court St., Auburn, Junior High School. $350,000. CD 5/16/52.

Me., Westbrook—SCHOOL—City, Richard Libby, chn. Bldg. Comn., City Hall, plans by Stevens & Saunders, 187 Middle St., Portland, high school, Stroudwater St. $420,000. CD 9/30/52.

Mass., Boston—STATE HOUSE ARCHIVE—State, Supt. Bldgs., State House, plans by Perry Shaw & Hepburn, Kehoe & Dean, 31 St. James Ave., 3 level rein.-con. underground state house archive between Bulfinch Bldg. and west wing, $300,000.

Mass., Falmouth—TOWN HALL etc.—Town, Town Hall Special Comn., Town Hall, town hall and national guard armory, $300,000.

▲ **Mich., Flint**—CIVIC CENTER—City, George Mann, Jr., chn. Bldg. Comn., Flint, plans by H. E. Boyster & Assocs., Inc., 2000 Industrial Bank Bldg., Detroit, brick, steel, stone municipal civic center. $5,000,000. CD 11/6.

Mich., Hazel Park—SERVICE—City, Hazel Park, service buildings to house Public Works Dpt. and Water Dept. incl. storage shop and office facilities. $165,000. Patrick Cosgrove, 22633 Stephenson Hy., engr.

Mich., Lansing—RECORDS—State, A. N. Langius, dir. State Bldg. Dpt., Lewis Cass Bldg., 300 S. Walnut St., plans by Malcomson, Fowler & Hammond, Inc., 1217 Griswold St., Detroit, brick, steel, concrete records bldg. for Dpt. Admin., $300,000.

Mich., Muskegon Heights—SCHOOL—City, R. J. Miles, clk., Peck and Sherman Sts., brick, steel high school addns. $425,000.

▲ **Mich., Rochester**—SCHOOL—City, Rochester School Dist., Rochester, bond issue voted Dec. 16, must be reaffirmed due to error in submitting project. The 9.75 mill tax to retire bonds was omitted. New Bond Election Feb. 24, high school. $1,800,000. H. E. Boyster & Assocs., 2000 Industrial Trust Bldg., Detroit, archts. CD 12/22.

Minn., Owatonna—SCHOOL—Bd. Educ., Mrs. Vera Hennerman, clk., plans by Ellerbe & Co., E. 505 First National Bank Bldg., St. Paul, 2 story, bsmnt., 60x140 ft. existing school addn., 1 story, 114x130 ft. school gymnasium addn., $750,000. CD 5/28/52.

Minn., Princeton—SCHOOL—Bd. Educ., C. Wicktor, clk., voted $650,000 bonds Jan. 25, grade school, $450,000; high school addn., incl. gymnasium-auditorium. $200,000. Haarstick, Lundgren & Assoc., W. 1385 First National Bank Bldg., St. Paul, archts. CD 1/19.

Miss., West Point—COURT HOUSE—Clay Co. plans by Chas. H. McCauley, Jackson Bldg., Birmingham, Ala., court house. $300,000. CD 4/14.

Mo., Carthage—SCHOOL—Bd. Educ., elementary school, Budlong and Regan Sts. $300,000.

Mo., Jennings (St. Louis 21 P.O.)—SCHOOL—Jennings School Dist., Bd. Educ., Otis A. See, Supt. Schools, 8840 Clifton Ave., Zone 21, voted $900,000 bonds Feb. 2, Jennings Elementary School, Jennings Junior High School addn., Gymnasium Industrial Arts & Home Economics Dpts. at Senior High School, auditorium at Senior High School.

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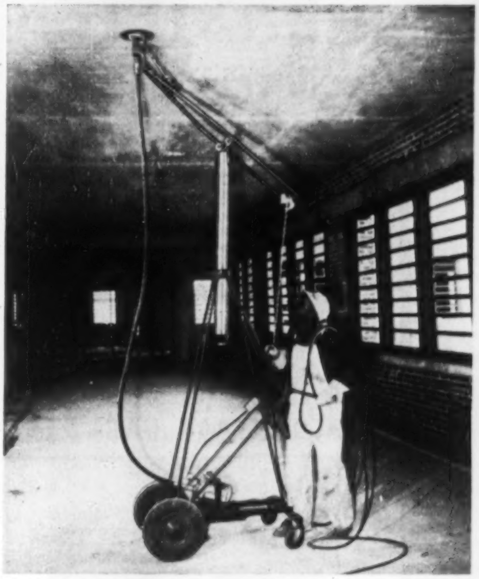

Mo., Marshall—SCHOOL—Bd. Educ., Marshall, plans by Marshall & Brown, 1016 Baltimore St., Kansas City, Mo., high school addn. **$325,000.**

Mo., Poplar Bluff—SCHOOL—Poplar Bluff School Dist. Bd. Educ., **$879,000** bond election Mar. 30, high school and elementary school, and imprvs., addns. to existing bldgs.

Mo., Wellston (St. Louis 14 P.O.)—SCHOOL—Wellston School Dist., Millard M. Halter, supt. schools, 6315 Wells Ave., Zone 14, voted **$750,000** bonds, 2 story, 108x272 ft., brick, rein.-con. elementary school, Klenlen and Wellsmar Aves. Marcel Boulicault, Ambassador Bldg., 411 N. 7 St., St. Louis, Zone 1, archts.

Neb., Lincoln—ACTIVITIES—Bd. Educ., 720 S. 22 St., plans by Davis & Wilson, 225 Stuart Bldg., high school activities bldg., at Southeast High School, 382 Van Dorn St. **$700,000.** CD 5/7/51.

▲ **N. J., Belleville**—SCHOOL—Bd. Educ., Belleville, plans by Emil Schmidlin, 586 Central Ave., East Orange, high school on 6-acre tract on Division St. **$2,000,000.** CD 12/1/43.

N. J., Passaic—CITY HALL—City, City Hall, plans by Kelly & Gruzen, 744 Broad St., Newark, 2 story city hall on tract at Paulison and Passaic Aves., adjacent to Senior High School, **$700,000.**

▲ **N. Y., Brooklyn**—HOUSING—New York City Housing Auth., 63 Park Row, New York, Zone 38, plans by Harry M. Prince, 101 Park Ave., New York, Zone 17, Coney Island Houses, apartments at 3025 W. 28 St., 3002-30 Surf Ave. and 3028 W. 29 St. **$4,730,000.** DiStasio & Van Buren, 136 Liberty St., New York, Zone 6, engrs. CD 6/10.

▲ **N. Y., Westbury**—SCHOOL—Westbury School Dist., Westbury, plans by Eggers & Higgins, 100 E. 42 St., New York, elementary school, Powells Lane, north of Northern State Parkway. **$1,000,000.** CD 10/2.

▲ **O., Cincinnati**—HIGH SCHOOL—Bd. Educ., 216 E. 9th St., plans by Felsberg & Gilespie, Ingalls Bldg., James Gamble Junior High School, Westwood-Northern Blvd., east of Montana, **$1,650,000.** Morell & Reik, Cincinnati Union Terminal Bldg., consult. engrs. CD 11/15/51.

▲ **Okla., Tulsa**—SCHOOLS—Bd. Educ., 410 S. Cincinnati St., plans by John Robb, 1114 S. Boston St., Bunche Elementary School, **$580,000;** Elementary School, 23 St. and Darlington Ave., **$440,000.** CD 10/9/50.

Ore., Pendleton—COURT HOUSE—Umatilla Co., Court House, Pendleton, $250,000 bond election May 21 court house, **$742,800.** Roald, Schmeer & Harrington, Portland Trust Bldg., Portland, archts. CD 5/29/45.

Pa., Blue Bell—SCHOOL—Whitpain Twp. School Dist., Blue Bell, elementary school or addn. **$300,000.**

Pa., Bridgeport—SCHOOL—Upper Merion Twp. School Dist., Bridgeport, elementary school, Brandywine School. **$700,000.**

Pa., Butler—JAIL—Comrs. Butler Co., Court House, plans by B. J. McCandless, 239 Fourth Ace., Ellwood City, jail. **$300,000.**

Pa., Coatesville—SCHOOL—Coatesville School Dist., Coatesville, plans by Lawrie & Green, 321 N. Front St., Harrisburg, elementary school, Kersey St. **$450,000.**

Pa., Conshohocken—HIGH SCHOOL—Conshohocken School Dist., Conshohocken, plans by Davis & Dunlap, 1717 Sansom St., Phila., high school addns., alterations, **$300,000.**

Pa., Jeffersonville—SCHOOL—West Norriton School Dist., Jeffersonville, elementary school, Arch St. **$300,000.**

Pa., Phila.—SCHOOL—Bd. Educ., 21 and Winter Sts., plans by Clifford E. Garner, 10 S. 18 St., Benjamin Franklin Elementary School, Rising Sun and Cheltanham Aves. **$300,000.**

Pa., Pittsburgh—SCHOOL—North Allegheny Joint School Dist., Perrysville, plans by Mitchell & Ritchey, 430 Alcoa Bldg., 1 story, brick, block, steel elementary school, McCandless Twp. **$300,000.**

Pa., Sharon Hill—HIGH SCHOOL—Darby Twp. School Bd., Sharon Hill, Junior High School. **$500,000.**

▲ **Pa., Springdale**—HIGH SCHOOL—Allegheny Valley Joint School Dist., Springdale, plans by Wesley Henger, 903 Renshaw Bldg., Pittsburgh, Junior-Senior High School addn. **$1,000,000.**

† **Pa., Tobyhanna**—RAILROAD ENGINE HOUSE, etc.—U. S. Eng. 121 N. Broad St., Phila., Zone 1, plans by Gilboy, O'Malley & Stopper (engrs.-archts.), Mears Bldg., Scranton, railroad engine house, 4 checker stations, post engineer equipment shed and utilities, incl. pumping station, **$100,000-$500,000.** CD 2/9/51.

▲ **Pa., West Point**—SCHOOL—Upper Gwynedd School Dist., West Point, plans by John S. Carver, 2112 Spruce St., Phila., elementary school. **$1,000,000.**

S. C., Columbia—RESIDENCE HALL—University of South Carolina, Columbia, plans by Lockwood Greene Engineers, Inc., Montgomery Bldg., Spartanburg, residence hall for Freshman Women. **$400,000.** CD 10/12/45.

▲ **Tex., Deer Park**—SCHOOLS—Deer Park Independent School Dist., Clyde Abshier, supt. Schools, Deer Park, plans by Emory White, 666 M & M Bldg., Houston, Junior High School and gymnasium, **$1,350,000;** Lynchburg Elementary School, **$300,000;** addns.-repairing group of elementary schools, **$350,000.** Bernard Johnson, 4926 Travis St., and Walter P. Moore, 2 Pinedale St., Houston, consult. engrs. CD 1/25.

Tex., Elgin—SCHOOL—Elgin Independent School Dist., Elgin, voted bonds Jan. 30, Grammar School, football stadium, some revamping, **$325,000.** CD 1/21.

▲† **Tex., Houston**—HOSPITAL—Veterans Admin., Vermont Ave. between H and I Sts. N. W., Wash. 25, D. C. 250-bed hospital addn. **$5,000,000.** CD 2/14/51.

Tex., Lampasas—HIGH SCHOOL—Lampasas Independent School Dist., Lampasas, plans by Philip G. Norton, Box 1169, Bryan, high school. **$325,000.** Bernard G. Johnson & Assocs., 4926 Travis St., Houston, and C. J. Godwin, Bryan, consult. engrs. CD 1/6.

Tex., San Antonio—SCHOOL—San Antonio Independent School Dist., Lavaca and Matagorda Sts., plans by Phelps & DeWees & Simmons, 342 W. Woodlawn Ave., and Glenn C. Wilson, 5025 Broadway, masonry "Woodlawn Hills" Elementary School, cafeteria, **$300,000.** CD 6/28/51.

Tex., Tuloso-Midway — SCHOOL — Tuloso-Midway Independent School Dist., c/o Wallace C. Hill, supt., Staples St., Corpus Christi, voted bonds Jan. 30, school. **$350,000.**

Tex., Wichita Falls—NURSES HOME—Wichita General Hospital (City-County), 8th at Brooks St., defeated bonds Feb. 2, masonry nurses home and conversion existing home into classrooms, **$335,000.** James R. Killebrew, 1710 Dayton St., archt. CD 2/1.

▲ **Wash., Ellensburg**—SCHOOL—School District No. 401, Ellensburg, bond election Mar. 9, Senior High School, **$1,300,000.** CD 1/13.

Wash., Ephrata—COURT HOUSE—Grant Co., Court House, plans by D. Holingbery, Moses Lake, 3 story, bsmt., 50x175 ft. court house addn. **$375,000.** CD 10/16/50.

Wash., Kelso—SCHOOL—School District 403, Kelso, elementary school, **$300,000.**

Wash., Lacey—SCHOOL—School Bd., North Thurston School District 3, Lacey, plans by Johnson & Botesch, First National Bank Bldg., Everett, high school, **$700,000.** Bonds valid. CD 12/30.

Wash., Omak—SCHOOL—School District 19, Omak, high school, **$400,000.**

Wash., Seattle—TANK FARM—Port of Seattle, Bell St. Terminal, Zone 1, tank farm with capacity for 4,485,000 gal. non-petroleum products **$300,000.** CD 11/25.

Wis., Oshkosh—HEALTH, etc.—Bd. Regents, State College, Madison, plans by Boyum, Schubert & Sorenson, Hoeschler Bldg., La Crosse, health and physical education bldg., Wisconsin State College, **$750,000.**

B. C., Castlegar—HOSPITAL—Castlegar Hospital Bd., Castlegar, plans by P. D. Smith, Trail, B. C. 32-bed hospital, **$400,000.**

Man., Winnipeg—OFFICE—Manitoba Power Comn., Canada Bldg., plans by Green & Assocs., 222 Osborne St., 2 story bsmnt., 85x200 ft. concrete, brick office bldg., Dominion St. **$750,000.**

▲ **Ont., Cornwall**—HOUSES—Central Mortgage & Housing Corp., (Govt. of Canada,) Ottawa, 1,000-1,500

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houses for workers engaged in St. Laurence Seaway, incl. schools, stores, etc. in East Cornwall, **$10,000,000-$15,000,000.** Dr. J. A. Phillips, Cornwall Planning Bd., chn. CD 2/11/48.

Ont., Guelph—SCHOOL—Guelph Bd. Educ., plans by G. S. Adamson, 906 Yonge St., Toronto, vocational type high school, Stevenson St. east of Eramosa Rd. **$500,000.**

Ont., London—OFFICE—Defence Construction Ltd., 40 Eglinton Ave. E., Toronto, 2 story office at Central Ordnance Depot No. 27, Highbury Ave. **$500,000.** H. I. Stricker, c/o owner, engr. CD 6/20/51.

▲ **Ont., Oshawa**—HOSPITAL UNIT—Oshawa General Hospital Bd., E. Marks, Jr., chn., plans by Govan, Verguson, Lindsay, Kaminker, Langley & Keenleyside, 17 Davenport Rd., Toronto, 6 story, 138-bed hospital unit, operating rooms, X-ray quarters, laboratories, etc. **$2,225,000-$2,700,000.** CD 4/5/51.

▲ **Ont., Toronto**—COLLEGIATE INSTITUTE, etc.—Bd. Educ., 155 College St., plans by F. C. Etherington, ch. archt., c/o owner, Jarvis Collegiate Institute addn. **$320,000;** Toronto Collegiate Institute addn., **$645,000;** school, McClintock Ave., **$375,000.** CD 12/15/43.

Ont., Toronto—SCHOOL—Etobicoke Bd. Educ., Cordova Ave., plans by Gordon S. Adamson, 52 St. Clair Ave. E., school in Alderwood. **$1,000,000.**

▲ **Ont., Toronto**—HOSPITAL—Lakeshore Hospital Assn., Dr. A. E. Noble, pres., plans by A. Martineau, 134 Clarence St., Kingston, 4 story, bsmnt., rein.-con., brick 150-bed Queensway General Hospital, Evans Ave. **$3,000,000.** CD 11/21/52.

▲ **Ont., Toronto**—CANCER RESEARCH—Province of Ontario, Parliament Bldgs., 7 story cancer research bldg., Wellesley and Sherbourne Sts. **$4,500,000.** CD 1/15/45.

Ont., Toronto—OFFICE—Scarborough Twp., 2001 Eglinton Ave. E., Postal Station H, Toronto, plans by Carter & Coleman, 2201 Kingston Rd., municipal office bldg. **$600,000.**

Que., Dorval—SCHOOL—School Comn. of Presentation of St. Vierge, Dorval, plans by J. N. Beauchamp, 82 Notre Dame St. W., Montreal, school addn., de l'Eglise St. **$350,000.**

Que., Montreal—SCHOOL—Catholic School Comn., 117 W. Ste. Catherine St., plans by Gaston Gagnier, 1449 Crescent St., school for Parish of St. Jean Viannery. **$350,000.** CD 12/8/52.

COMMERCIAL BUILDINGS

Calif., Belmont—HOMES—R. R. Roy McCune, (developer) 1909 Portala Road, Woodside, 140 homes in subdivision.

Calif., Del Rosa—DWELLINGS—Arrowhead Builders, 1153 "F" St., San Bernardino, 70 frame, stucco dwellings in Tract 3959, **$525,000.**

▲ **Calif., El Centro**—DWELLINGS—Phil Yousem, 1500 Lincoln Blvd., Venice, plans by Absmeir & O'Leary, 1898 Crenshaw Blvd., Los Angeles, 183 frame, stucco dwellings. **$1,500,000.**

Calif., Fullerton—DWELLINGS—Geo. M. Holstein & Sons, 166 E. 17 St., Costa Mesa, plans by Richard Pleger & William Blurock, 1415 Coart Blvd., Corona Del Mar, 57 frame, stucco dwellings, Malden and Tamarack Sts. **$500,000.**

Calif., Gardena—DWELLINGS—King Constr. Co., 10024 S. Western Ave., Los Angeles, plans by Davis & Quigley, 43 Maloga Ave., Plaza, Palos Verde Estates, 51 frame, stucco dwellings. **$400,000.**

Calif., Los Angeles—DWELLINGS—Don Hunt & Ernest Giese, c/o Edward H. Fickett, archt., 5657 Wilshire Blvd., 40 frame, stucco dwellings, 120 and Western Ave. **$350,000.**

Calif., Redlands—DORMITORY—University of Redlands, Redlands, plans by Marsh, Smith & Powell, 208 W. 8 St., Los Angeles, 3 story, 44,000 sq. ft. rein.-con. girls dormitory. **$500,000.**

Calif., San Bernardino—DWELLINGS—Paul Sullivan, 3003 Glenview Ave., 55 frame, stucco dwellings, 28 St. from California to Muscott Sts. **$420,640.**

Calif., Torrance—SHOPPING CENTER—Wagner Realty Co., c/o Martin Stern, Jr., archt., 450 N. Beverly Dr., Beverly Hills, reinforced brick shopping center, 36,000 sq. ft. market and 21,000 sq. ft. stores. **$400,000.**

▲ **Colo., Denver**—TEMPLE, etc.—Temple Emmanuel, E. 16 Ave. and Pearl St., plans by Percival Goodman, archt. and engr., 19 E. 48 St., New York 17, N. Y. temple and school, **$1,000,000.**

Conn., Manchester — CHURCH — St. Mary's Episcopal Church, 103 Church St., plans by Raymond Julian, 29 Muttontown Rd., Syossett, N. Y. Church, **$350,000.** CD 10/27/50.

Del., Wilmington—APARTMENT—J & J Corp., c/o Vincent A. Theisen, Industrial Trust Bldg., apartment, 2200 block Penna. Ave. **$300,000.**

Ill., Bloomington—ADMINISTRATION, etc.—Illinois Wesleyan University, Bloomington, plans by Schaeffer, Hooton & Wilson, Peoples Bank Bldg., 40x155 ft. administration bldg., 25 ft. high, **$210,000;** 7,000 sq. ft. irregular auditorium unit, **$300,000.**

Ill., Wilmette—SCHOOL—St. Francis Xavier Church, 912 Linden Ave., plans by T. Clifford Noonan, 1127 Greenwood Ave., school. **$350,000.**

▲ **Ind., French Lick**—HOTEL—French Lick Hotel Co., A. J. Newman, genl. mgr. remodeling hotel bldgs. **$1,000,000** or more.

▲ **Ind., Marion**—SHOPPING CENTER—A. W. Crossman, Glass Block, Marion, shopping center, Marion Ave. **$1,500,000.**

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you need all 4!

Effective, two-stage, sewage sludge digestion involves far more than just a heated tank! There are four major — and interrelated — requirements.

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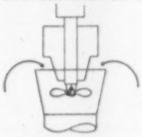

Calls for intensive mixing in the Primary by means of high-capacity propeller and draft tube.

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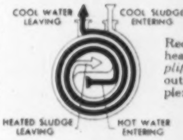

Requires an efficient heat exchanger of *simplified* design . . . without excessive and complex instrumentation.

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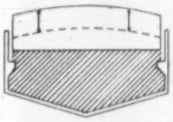
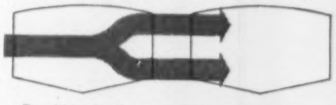


Demands a Secondary equipped with a movable, steel dome gas holder to even out fluctuations and insure a constant supply to gas utilization equipment.

4. Simplified Control



Requires a simple and automatic means of transferring sludge and liquor from the Primary to the Secondary at rate of feed.

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It will pay you to avoid the "piecemeal" approach. As proof, we suggest you compare the characteristics of Dorr Multdigestion* with any other digestion equipment.

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▲ **Ind., Muncie**—SHOPPING CENTER—Northwest Plaza Shopping Center, c/o White & Haymond, 108 E. Washington St., shopping center for several stores, **$1,500,000.** H. K. Morrison, 414 Western Reserve Bldg., consult. engr.

Kan., Kansas City—SHOPPING CENTER—J. C. Nichols Co., 310 Ward Parkway, Kansas City, Mo., plans by E. W. Tanner & Assoc., 310 Ward Parkway, Kansas City, Mo., Prairie Village Shopping Center, 69 and Terrace Sts., RFD from Kansas City, Kan. **$750,000.**

Mass., Brighton—OUTPATIENT—St. Elizabeth's Hospital, 736 Cambridge St., Brighton, plans by Curtin & Riley, 45 Newbury St., Boston, 3 story, out-patient bldg., incl. clinics, living quarters, medical library. **$500,000.**

Mass., Holyoke—SHOPPING CENTER—Owner, c/o Benj. L. Cohen & Sons, 7 Water St., Boston, plans by Thomas A. Kirley, 125 Amity St., Amherst, shopping center, Davis, East and South Sts., **$800,000.**

Mass., Newton—DORMITORY—Andover Newton Theological School, 210 Harrick Rd., plans by Perry, Shaw & Hepburn, Kehoe & Dean, 31 St. James Ave., Boston, dormitory and dormitory addn., alterations, Herrick Rd. **$350,000.**

Mass., Newton—SHOPPING CENTER—V. Ciulla & Son, 455 S Main St., Sharon, shopping center, incl. 8 stores and garage, Oak Hill Park, **$350,000.** Lester M. Lechter, 739 Boylston St., Boston, designer.

Mass., Randolph—RESIDENCES—James F. McLenaghan, Pond St., plans by John Spiers, 77 Beach St., Wollaston, 68 residences. **$680,000.**

Mich., Lansing—CHURCH—Grace Methodist Parish, c/o Lee and Kenneth C. Black, archts., 706 Capitol Savings & Loan Bldg., 1 story, bsmnt., brick, stone church. **$400,000.**

Mich., Lansing—HEADQUARTERS—Michigan Conference Seventh Day Adventists, 620 Townsend St., plans by Lee & Kenneth C. Black, 706 Capitol Savings & Loan Bldg., 2 story, bsmnt., brick, concrete state headquarters office, **$300,000.**

▲ **Mich., Royal Oak**—OFFICE—Michigan Life Insurance Co., Scott E. Lamb, pres., 2988 E. Grand Blvd., Detroit, 4 story, brick, steel, concrete office, Woodward Ave. **$1,600,000.**

Minn., St. Peter—DORMITORY—Gustavus Adolphus College, E. M. Carlson, pres., plans by Magney, Tusler & Setter, 202 Foshay Tower, Minneapolis, men's dormitory. **$500,000.**

Neb., Lincoln—RESIDENCE HALL—Union College, 3800 S. 48 St., women's residence hall. **$500,000.** CD 3/12/52.

N. J., Teaneck—COLLEGE—Fairleigh Dickinson College, 207 Montruss Ave., Rutherford, plans by Fellheimer & Wagner, 155 E. 42 St., New York, 17, N. Y., college bldg. **$300,000.**

N. Y., New York—APARTMENT—Jacob Schneider, 16 Court St., Brooklyn, Zone 2, plans by Maxfield Blaufeux, 44 Court St., Brooklyn, Zone 2, 6 story apartment, Blackstone Ave. and 242 St. **$966,000.**

N. Y., Whitestone—SHOPPING CENTER—Redmount Sales Corp., c/o Leo V. Berger, archt., 356 Fulton St., Brooklyn, 1 story, 130x300 ft. shopping center, Cross Island Blvd. from 154 to Clintonville Sts. **$430,000.**

▲ **N. C., Jacksonville**—CHURCH—Infant of Prague Church, Jacksonville, plans by John R. Valentine, Marshalberg, church. **$1,000,000.**

▲ **N. D., Devils Lake**—HOSPITAL—Mercy Hospital, Devils Lake, plans by Hills, Gilbertson & Hayes, 6009 Wayzata Blvd., Minneapolis, Minn., hospital addn. **$1,000,000.**

Okla., Tulsa—SHOPPING CENTER—Ottis E. Nidiffer, 4720 E. 21 St., plans by John Duncan Forsyth, 1441 S. Detroit St., 62,150 sq. ft. Arkansas sandstone, brick, steel, concrete frame and fdn. Mayo Shopping Center. **$750,000.**

Ore., Portland—HOSPITAL—Holladay Park Hospital, 1132 N.E. 2nd St., plans by Hollis Johnston, Concord Bldg. 72-bed hospital addn. **$720,000.** CD 10/24/47.

▲ **Pa., Phila.**—NURSES HOME—Presbyterian Hospital, 51 N. 39 St., plans by Chatfield & Schlicher, 324 W. Chelten Ave., nurses home, **$1,100,000.**

Pa., Phila.—THEATRE—Viking Corp., Widener Bldg., plans by William H. Lee, 16 S. Broad St., Aldine Theatre alterations, incl. air-conditioning, **$300,000.**

Pa., Pittsburgh—HIGH SCHOOL—Holy Innocents R. C. Church, Ashlyn and Thornton Sts., plans by Marlier & Johnstone, 1107 Empire Bldg., 2 story, bsmnt., 60x120 ft., brick, block, steel parochial high school. **$350,000.**

Pa., Sharon Hill—SUPERMARKET—Food Fair, Inc., 2223 E. Allegheny Ave., Phila., plans by Louis Kasoff, c/o owner, supermarket, **$350,000.**

Pa., Trooper—SHOPPING CENTER—Park Ridge Shopping Center, Att. Joseph Lesawyer, 1426 Walnut St., Phila., shopping center, Rte. 422. **$500,000.**

Tex., Dallas—LODGE—Edwin J. Kiest, Masonic Lodge, c/o John A. Maxwell, Jr., 5323 Mockingbird Lane, plans by Milam & Roper, 368 Casa Linda Plaza, lodge. **$300,000.**

Tex., Dallas—SHOPPING CENTERS—W. L. Wyman & Son, 1408 N. Atoll St., 2nd masonry type expanded shopping center unit **$300,000;** 3rd expanded shopping center unit, **$335,000,** in vicinity Overton Rd. and Sunnyvale.

Tex., Fort Worth—SANCTUARY, etc.—First Presbyterian Church, 5 and Taylor Sts., plans by Preston M. Geren, 1607 Fort Worth Natl. Bldg. and John W. Floore, 1401 W. Lancaster St., assoc. archts., sanctuary, **$300,000;** offices and classrooms bldg., **$325,000;** social-educational-nursery, **$350,000.**

▲ **Tex., Grand Prairie**—DUPLEXES—S. A. Fishburn, c/o Vought Manor Subdivision, Grand Prairie, 18 duplexes, **$310,000;** 24 duplexes, **$361,125;** 20 duplexes, **$328,140;** 26 duplexes, **$369,400;** shopping center, **$450,000.**

Tex., Grand Prairie—STORE, etc.—Wyatt Food Stores, 6100 Cedar Springs St., Dallas, masonry store and cafeteria, off S. Center and Jefferson Blvd. **$550,000.**

▲ **Tex., Houston**—DWELLINGS—A. E. Bailey & V. L. Evans, State Natl. Bank Bldg., 60 frame dwellings, concrete slab fdn., **$360,000;** 58 frame dwellings, cedar post fdn., **$348,000;** 68 frame dwellings, concrete slab fdn., **$398,150;** 53 frame dwellings, cedar post fdn., **$318,000;** 65 frame, masonry trim dwellings, concrete slab fdn., **$390,000;** 56 frame, masonry trim dwellings, concrete slab fdn., **$336,500,** in area of Reed Woods subdivision. CD 6/29/50.

Tex., Houston—DWELLINGS—Inwood Terrace, 5303 Willowglen St., 32 frame, brick dwellings, concrete slab fdn., Myrtlewood and Windemere Sts. **$325,000.**

Tex., Houston—DWELLINGS—Keystone Builders, 8188 Long Point Rd., plans by Dunaway & Jones, 4919 Montrose Blvd., 28 cedar shake dwellings, concrete slab fdn. **$324,800;** 34 cedar shake with brick trim dwellings, concrete slab fdn. **$394,400** in 2nd sect. of Glenview Addn.

▲ **Tex., Houston**—DWELLINGS—Montgomery Land Co., 804 E. Eagle St., Sect. 1, 48 dwellings, **$362,500;** Sect. 2, 42 dwellings, **$310,000;** Sect. 3, 53 dwellings, **$378,100;** Sect. 4, 46 dwellings, **$341,750;** Sect. 5, 60 dwellings, **$380,125;** Sect. 6, 57 dwellings, **$369,000,** off Chocolate Bayou Rd.

Tex., Houston—COMMERCIAL—Shannon Pfeffer & Assocs., 3320 Binz St., commercial bldg., 6½ acre tract near Texas Southern University. **$400,000.**

Tex., Houston—DWELLINGS—Thomas P. Wier, Jr., 1st Natl. Bank Bldg., 10 rambling type frame dwellings, concrete slab fdn. **$310,000;** 13 frame, masonry dwellings, concrete slab fdn. **$321,000,** in Braes Heights.

Tex., Huntsville—CHURCH—First Baptist Church, Huntsville, reconstr. burned out church. **$350,000.**

▲ **Tex., San Antonio**—DWELLINGS—Bellaire Lumber Co., 7903 S. Flores St., Unit 1, 33 dwellings, concrete slab fd. **$319,000;** Unit 2, 28 dwellings, concrete slab fdn. **$300,000;** Unit 3, 41 frame dwellings, concrete slab fdn. **$388,500;** Unit 4, 38 frame, masonry trim dwellings, **$366,125;** Unit 5, 44 dwellings, concrete slab fdn., **$395,000;** Unit. 6, 37 frame, masonry trim dwellings, concrete slab fdn. **$355,000,** off Military Hy.-Pleasanton Rd. Shopping Dist. Area.

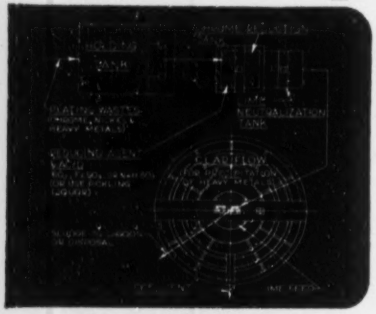
▲ **Tex., San Antonio**—DWELLINGS—Green Meadows Development Co., Inc., 3800 San Pedro Ave., Unit 1,

(Continued on page 260)

MONROE, MICHIGAN • INDUSTRIAL INSTALLATION

Clariflow

Plating Waste Treatment
Continuous Flow
Package Unit



Removal of Toxic Metals

Clariflow provides for chrome reduction, precipitation of hydrous oxides of chromium, nickel, copper, zinc, lead and iron; sludge separation; sludge thickening and disposal.

Alkaline and Acid Wastes

These wastes may be treated by batch or continuous process. Batch treatment requires only the addition of chemicals and mixing equipment.

Clariflow is engineered in circular, square or rectangular shapes for new installations or to modernize existing equipment.

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WALKER PROCESS EQUIPMENT INC.
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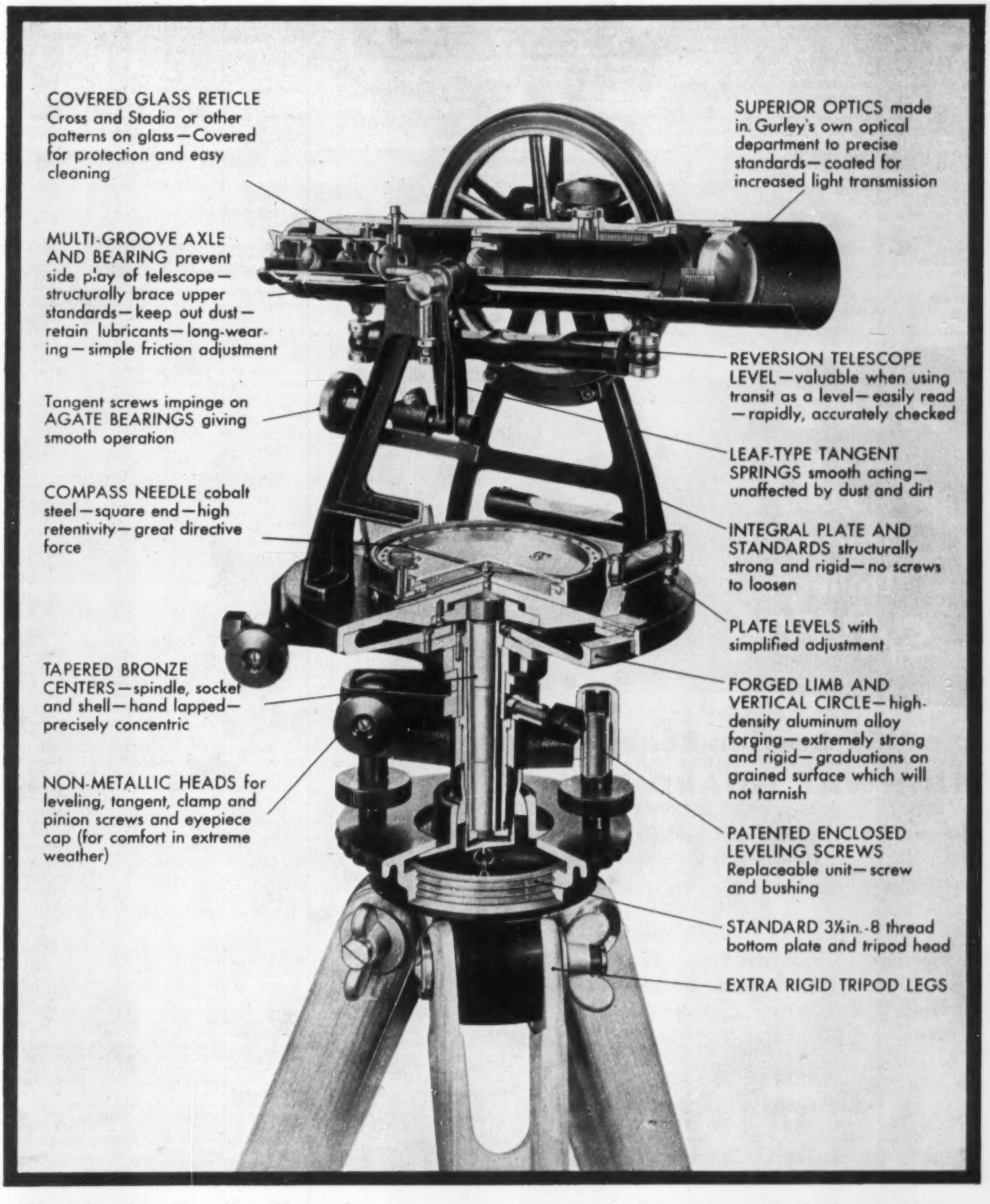

COVERED GLASS RETICLE Cross and Stadia or other patterns on glass—Covered for protection and easy cleaning

MULTI-GROOVE AXLE AND BEARING prevent side play of telescope—structurally brace upper standards—keep out dust—retain lubricants—long-wearing—simple friction adjustment

Tangent screws impinge on AGATE BEARINGS giving smooth operation

COMPASS NEEDLE cobalt steel—square end—high retentivity—great directive force

TAPERED BRONZE CENTERS—spindle, socket and shell—hand lapped—precisely concentric

NON-METALLIC HEADS for leveling, tangent, clamp and pinion screws and eyepiece cap (for comfort in extreme weather)

SUPERIOR OPTICS made in Gurley's own optical department to precise standards—coated for increased light transmission

REVERSION TELESCOPE LEVEL—valuable when using transit as a level—easily read—rapidly, accurately checked

LEAF-TYPE TANGENT SPRINGS smooth acting—unaffected by dust and dirt

INTEGRAL PLATE AND STANDARDS structurally strong and rigid—no screws to loosen

PLATE LEVELS with simplified adjustment

FORGED LIMB AND VERTICAL CIRCLE—high-density aluminum alloy forging—extremely strong and rigid—graduations on grained surface which will not tarnish

PATENTED ENCLOSED LEVELING SCREWS Replaceable unit—screw and bushing

STANDARD 3½in.-8 thread bottom plate and tripod head

EXTRA RIGID TRIPOD LEGS

The Gurley Precise Transit

W. & L. E. Gurley, Troy, N. Y.

GURLEY

(Continued from page 258)

38 frame dwellings, concrete slab fdn. $365,120; Unit 2, 38 frame dwellings, concrete slab fdn. $305,500; Unit 3, 42 frame, cedar shake dwellings, concrete slab fdn. $398,125; Unit 4, 32 brick dwellings, concrete slab fdn. $327,000; Unit 5, 35 frame, masonry trim dwellings, concrete slab fdn. $345,675; Unit 6, 46 frame dwellings, concrete slab fdn. $433,415; Unit 7, 28 brick dwellings, concrete slab fdn., $300,000, 550 lot extens. of Green Meadows Estates, off Blanco Rd.

Tex., San Antonio — COMMERCIAL CENTER — **Green Meadows Development Co., Inc., 3800 San Pedro Ave.,** commercial center, 11-acre tract of Green Meadows Estate off Blanco Rd. **$500,000.**

Tex., San Antonio—DWELLINGS—E. S. Johnson Contractor, 3659 Culebra Rd., 34 frame, masonry trim dwellings, concrete slab fdn., Loy Dr. in Hillcrest. **$315,000.**

Tex., San Antonio—CONVENT—Sisters of Charity of the Incarnate Word, Broadway and Hildebrand Sts., plans by O'Connell & Probst, 504 W. 7th St., Austin, 4 story, bsmnt., rein.-con. frame and fdn. Sisters' Home, **$500,000.** W. E. Simpson Co., 945 Milam Bldg., San Antonio, and B. Segall, 609 W. 6th St., Austin, engrs.

Tex., San Antonio—DWELLINGS—C. L. Turbeville, 723 Augusta St., 26 dwellings, concrete pier and beam fdn. OD siding, attached garages, Hub St. in Coliseum Park. **$309,500.**

▲ **Va., Alexandria**—RESIDENCES—Charles Assoc. Inc., c/o South Robbins, 2018 Mt. Vernon Ave., Alexandria, 130 one story masonry residences. **$1,500,000.**

▲ **Wash., Bellevue**—HOSPITAL—Overlake Hospital Assn., Bellevue, hospital. **$1,000,000.**

Wash., Seattle—CLUB—Swedish-American Center, Inc., P.O. Box 746, plans by Miller & Ahlson, 1410 Hubbel Pl., 108x160 ft. club bldg. **$600,000.** CD 12/11.

Wash., Yakima—DEPARTMENT STORE—W. T. Grant Co., 130 W. 42 St., New York, N. Y., 2 story bsmnt. department store. **$600,000.**

Wis., Milwaukee—PARISH HALL—St. Martin Lutheran Church, 1500 S. 16 St., plans by H. Logemann, 5353 N. Lake Dr., Zone 11, parish hall. **$300,000.**

▲ **Wis., Green Bay**—HOSPITAL—St. Mary's Hospital, 411 S. Webster Ave., hospital. **$3,000,000.**

N. S. Sydney—ORPHANAGE—Roman Catholic Episcopal Corp., Antigonish, orphanage bldg. **$300,000.**

▲ **Ont., Toronto**—APARTMENT BLOCK—Avenue Park Investments Ltd., c/o John Daniels, archt., 1398 Eglinton Ave. W., four 3 story, bsmnt., 145x175 ft., concrete block, brick apartments, incl. a total of 250-suites, Wilson Ave. and Avenue Rd. **$2,000,000.**

Ont., Toronto—APARTMENT—Owner, c/o Gordon Bazeley, 193 Forest Hill Rd., 7 story, 76x100 ft., 49-suite steel, brick, block apartment, Bayview and Hilsdale Aves. **$525,000.**

▲ **Ont., Toronto**—APARTMENT DEVELOPMENT—Woodander Ltd., c/o Peter Caspari, archt., 496 Church St., 14 story, 800-suite three blocks, apartment development, Wood and Yonge Sts. **$8,000,000.** CD 12/9.

▲ **Que., Hull**—HOUSING DEVELOPMENT—Royal Mount Realties Inc., Suite, 412, 1434 St. Catherine St. W., concrete, brick housing development near Alymer Zone south of here **$5,000,000.**

▲ **Que., Montreal West**—DWELLINGS—Syndicate, c/o E. Pitts & Co., Inc., 5157 W. Sherbrooke St., Montreal, 60 concrete, brick dwellings, Decarie Blvd. **$1,140,000.**

Que., Three Rivers—HOTEL—o-Cie de l'Hotel St. Maurice **Ltee, 1530 Badeaux St., 3 story, hotel addn. $300,000.**

INDUSTRIAL BUILDINGS

Ala., Birmingham—PLANT addn.—Birmingham Publishing Co., 2 Ave. and 19 St. S., plant addn. **$100,000.**

Ala., Cullman—PLANT—Clo-Bin, Inc., Carbondale, mfg. plant. **$100,000.**

Calif., Los Nietos—FACTORY, etc.—Wyandotte Chemical Corp., 111 W. College St., plans by Austin Co., 777 W. Washington Blvd., Los Angeles, tilt-up concrete factory and warehouse. **$200,000.**

Conn., Orange—PLANT—Gaetano Industries, Inc., c/o Leo F. Caproni, archt., 1221 Chapel St., New Haven, plant addn., Post Rd. and Race Brook Rd. **$100,000.**

Ill., Chicago—FACTORY—Southern Cotton Oil Co., 4421 W. 31 St., factory addn. **$200,000.**

▲ **Ill., Madison**—PLANT FACILITIES—Dow Chemical Co., R. E. McNulty, Madison Division Mgr., Madison, Ill., addnl. facilities for magnesium fabrication plant, incl. installation 13,200-ton extrusion press and relates auxiliaries, etc.

▲ **Ill., Naperville**—FACTORY—Foote Bros. Gear & Machine Co., 4545 Western Ave., Chicago, plans by Graham Anderson Probst & White, 80 E. Jackson Blvd., Chicago, Zone 4, 100,000 sq. ft. factory, on 120 acres land, **$1,000,000.**

▲ **Ind., Kokomo**—PLANT—Delco-Radio Div. of General Motors, Union and Firmin Sts., 2 large plant addns. **$1,500,000** or more.

Ia., Blencoe—GRAIN ELEVATOR—Blencoe Co-operative Elevator Assn., Blencoe, grain elevator. **$150,000.**

▲ **La., Franklin**—PLANT—Columbian Carbon Co., 41 E. 42 St., New York 17, N. Y., oil process carbon black plant, **$3,000,000.**

Mass., Burlington—MANUFACTURING—High Voltage Eng. Corp., 7 University Rd., Cambridge, mfg. bldg., Sears St. **$300,000.**

Mass., Waltham — MANUFACTURING — Tracerlab, Inc., 130 High St., Boston, geiger counter mfg. bldg., Auto Rte. 128. **$100,000.**

▲ **Mich., Detroit**—PLANT—Buick Motor Div., General Motors Corp., General Motors Bldg., Detroit, plant expansion, 150,000 sq. ft. addnl. floor space for axle production, automatic transmission, forge shop and foundry. **$1,500,000.** Argonaut Realty Div., General Motors Corp., General Motors Bldg., Detroit, engr.

Mich., Flint—PLANT—Fisher Body Div., General Motors Corp., Flint, 1 story, masonry Plant No. 1 addn. **$950,000.** Argonaut Realty Div., General Motors Corp., General Motors Bldg., Detroit, engrs.

▲ **Mich., Grand Rapids**—PLANT—Fisher Body Div. General Motors Corp., General Motors Bldg., Detroit, 1 story, masonry glass, concrete, 260,000 sq. ft. plant addn. **$2,200.000.** Argonaut Realty Div. General Motors Corp., General Motors Bldg., Detroit, engr. CD 6/29/50.

▲ **Mich., Harbor Beach**—POWER PLANT—Detroit Edison Co., Walker L. Cisler, pres., 2000 2 St., Detroit, brick, steel, concrete power plant, steam generating station; incl. dredging and filling, etc., **$100,000,000.**

Mich., Pontiac—PLANT—Fisher Body Div., General Motors Corp., General Motors Bldg., Detroit, 90,000 sq. ft. body stamping plant addn. **$800,000.** Argonaut Realty Div., General Motors Corp., General Motors Bldg., Detroit, engr.

▲ **Mich., Pontiac**—PLANT—Pontiac Motors Div., General Motors Corp., Robert M. Critchfield, genl. mgr., Pontiac, 1,350,000 sq. ft. plant addn. **$12,000,000.** Argonaut Realty Div., General Motors Corp., General Motors Bldg., Detroit, engr.

Minn., Minneapolis—GARAGES—Twin City Rapid Transit Co., 1 So. 11 St., plans by L. B. Abbett, 405 Wesley Temple Bldg., two 1 story, 100x600 ft., 150x150 ft. storage garages addns., 31 St. and Nicollet Ave.; two 1 story, 100x600 ft., 150x150 ft. storage garage addns., Washington Ave. North between 24 and 26 Aves. **$550,000.**

Minn., Ortonville—PLANT—Ortonville Produce Co., Ortonville, produce plant for egg handling, storing and handling produce, **$100,000.**

▲ **Minn., St. Paul**—POWER PLANT—Northern States Power Co., 15 S. Fifth St., Minneapolis, 100,000 kw capacity steam electric unit at High Bridge Plant, **$15,000,000.**

Mo., Overland (St. Louis 14 P.O.)—PLANT—Construction Materials Co., 4623 Chippesa St., St. Louis, Zone 16, reddy-mix concrete plant and auxiliaries on 45 acre tract on Woodson Rd. and Terminal R.R. tracks.

Neb., Omaha—WAREHOUSE—The Sidles Co., 19 and Howard Sts. plans by Cecil A. Martin & Assocs., Kar-

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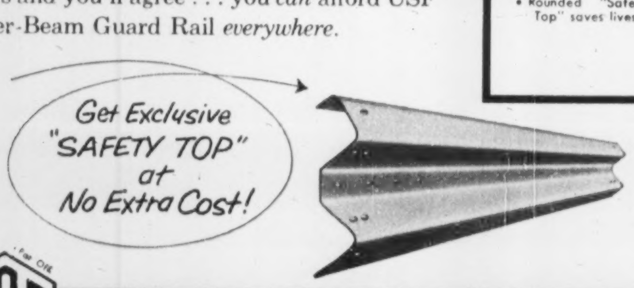

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bach Block, and L. E. Wilkie, 513 S. 20 St., warehouse. **$300,000.**

N. Y., Brooklyn—FACTORIES—S. M. L. Realty Corp., 655 Berriman St., plans by Jack Fein, 44 Court St., Zone 2, four 1 story factories, 973-77 Linwood St., 870-80 and 882-92 Stanley Ave., 890-900 Essex St. **$185,000.**

N. Y., Flushing—GAS STATION—Robert Watson, c/o Herman K. Ron, archt., 1451 Broadway, New York, Zone 18, 1 story, 28x75 ft. gas station, auto repairs, show room, Francis Lewis Blvd. and 32 Ave. **$100,000.**

Okla., Ardmore—STORAGE ELEVATOR—Murphy Milling Co., Ardmore, 500,000 bu. grain storage elevator. **$275,000.** L. H. Heiliger, 6001 N.W. 46 St., Oklahoma City, consult. engr.

Pa., McKeesport—WAREHOUSE—Baehr Bros., 801 Walnut St., plans by Forsyth & Blezard, 901 Ridge Ave., Pittsburgh, 1 story, 17,000 sq. ft., brick, block, steel warehouse, **$150,000.** National Biscuit Co., 449 W. 14 St., New York, N. Y., lessee.

Pa., Norristown—SALES AND SERVICE—Marchese Bros., Main and Markley Sts., plans by Francis Jobson, Valley Forge, auto sales service bldg. and gasoline service station, **$250,000.**

Pa., Phila.—WAREHOUSE—Interstate Iron & Supply Co., 12 S. 12 St., plans by Brancik, Conte & Assocs., 119 Michigan Blvd., Chicago, Ill., 1 story, 16,500 sq. ft. brick, glass warehouse. **$100,000.** CD 7/14.

▲ **Pa., West Mifflin**—PLANT—General Motors Corp., Fisher Body Div., General Motors Bldg., Detroit, Mich., plans by Argonaut Realty Corp., Div. of General Motors Corp., Research Bldg., Detroit, Mich., 1 and 1 story, brick, block, steel, assembly plant addn. **$1,000,000.**

Tex., Amarillo—GRAIN ELEVATOR—Farmers Elevator Co., Amarillo, 250,000 bu. capacity grain elevator. **$190,000.**

Tex., Dallas—TRANSFORMER SUB-STATIONS—Dallas Power & Light Co., Dallas Power & Light Bldg., transformer sub-stations, east of Beckley St. and north of Overton St., **$250,000;** at N. Haven Rd. and Cotton Belt Ry. tracks, **$325,000.**

Tex., Dallas—FACTORY—Temple Mfg. Co., 3103 S. Haskell St., constr. another complete production line to factory for mfg. containers or industrial boxes. **$125,000.** H. E. Bovay, M. Esperson Bldg., Houston, consult. engr.

Tex., El Paso—FACTORY—Atlas Telephone Equipment Co., c/o Max Flatow & Assocs., archts., 1840 Lomas Blvd., Albuquerque, N. M., factory for mfg. telephone equip., etc. **$250,000.**

Tex., Fort Worth—STORAGE—Records Storage Corp., 4th and Bailey Sts., Dallas, plans by Preston M. Geren, 1607 Fort Worth Natl. Bank Bldg., storage. **$150,000.**

Tex., Fort Worth—FACTORY—Temple Mfg. Co., 3103 S. Haskell St., Dallas, container factory or box factory imprvs. and expansion. **$200,000.** H. E. Bovay, M. Esperson Bldg., Houston, consult. engr.

Tex., Houston—PLANT—Gulf Brewing Co., 5301 Polk St., beer production plant expansion, **$250,000;** storage or warehousing, **$150,000;** keg house and refrigeration, **$150,000.**

Tex., Jacksonville—PLANT—Wynnwood Products, Inc., c/o Angus Wynne, Jr., 2311 Salerno St., Dallas, processing plant, on site adjacent to S. P. Ry. tracks. **$500,000.**

▲ **Tex., Marshall**—PLANT—Woodlawn Processing Co., Marshall, natural gas processing plant **$1,750,000.**

Tex., Mineola—FACTORY—Deaton of Dallas, 606 N. Edgefield St., plans by Boatwright & Thompson, 1330 N. Industrial Blvd., Dallas, clothing mfg. factory. **$200,000.**

Wash., Seattle—PLANT—United Controls Corp., 4540 Union Bay Pl., 19,000 sq. ft. plant addn. **$250,000.**

Wis., Janesville—PLANT—General Motors Corp., Fisher Body Div., General Motors Bldg., Detroit, Mich. 2 story, 100x640 ft., auto body plant addn.

Alta., Blairmore—POWER PLANT—West Canadian Collieries Ltd., Blairmore, power plant. **$100,000.**

Sask., Prince—GRAIN ELEVATOR—National Grain Co. Ltd., Price, grain elevator, **$100,000.**

▲ **Sask., Regina**—PARTS DEPOT—Ford Motor Co. of Canada Ltd., Windsor, Ont., plans by Stock, Ramsay & Assocs., 1745 Scarth St., 1 story parts depot, near 4 Ave. and Broad St. **$1,000,000.** CD 2/21/51.

UNCLASSIFIED

Alabama—TELEPHONE LINES—Fayette Telephone Co., Fayette, telephone lines, Fayette Co. **$250,000.** J. B. McCrary Eng. Co., Atlanta Federal Savings Bldg., Atlanta, Ga., consult. engr.

Ala., Graysville—GAS DISTRIBUTION SYSTEM—City, City Hall, natural gas distr. sys. addn. **$300,000.** J. W. Goodwin Eng. Co., 2111 7 Ave. S., Birmingham, Ala., consult. engr.

▲ **California**—VEHICULAR TUBE—Dpt. P. Wks. Sacramento, and State of California, P.O. Box 1499, Sacramento, state has applied for a Dpt. of the Army approval of plans for construction of 3,300 ft. vehicular tube under Oakland Harbor between cities of Oakland and Alameda Calif. at Webster St. approx. 450 ft. westerly of existing Posy Tube, **$15,000,000.** CD 11/5/43.

Colorado—RURAL DISTRIBUTION LINES—San Isabel Electric Assn., Pueblo, 154 mi. rural distr. lines and sys. imprvs., Pueblo Co. **$360,000.** C-B Eng. Co., 25 Grove St., Denver, consult. engr.

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Fla., Jacksonville Beach—ELECTRIC DISTRIBUTION SYSTEM IMPRV.—City, City Hall, electric distr. system imprvs. **$100,000.** Smith & Gillespie, P.O. Box 4817, Jacksonville, consult. engrs. CD 2/3/49.

Fla., Tallahassee—ELECTRIC DISTRIBUTION SYSTEM—City, City Hall bond election Feb. 23, electric distr. sys. and street lighting, **$1,500,000.** Bond election 12/8 defeated. CD 10/27.

Georgia—TELEPHONE LINES—Pineland Telephone Co-operative, Swainsboro, telephone lines, Emanuel and Burke Counties. **$350,000.** Thomas McCall Eng. Co., 259 Amelia St., Orangeburg, S. C., consult. engr.

Georgia—TELEPHONE LINES—South Georgia Telephone Co-operative, Adel, telephone lines, Cook, Berrien and Brooks Counties. **$500,000.** E. P. McLean, Moultrie, Ga., consult. engr.

Georgia—TELEPHONE LINES—Union Point Telephone Co., Union Point, 150 mi. telephone lines, Greene Co. **$200,000.** J. B. McCrary Eng. Co., Atlanta Federal Savings Bldg., Atlanta, consult. engr.

▲† **Ga., St. Marys**—WHARFS, etc.—U. S. Eng., 200 E. St. Julien St., Savannah, plans by Robert & Co. Assocs., 96 Poplar St. N.W., Atlanta, wharfs and approach trestles, St. Mary's King Bay Ammunition Loading Terminal, **$3,000,000.**

Ga., Villa Rica—GAS DISTRIBUTION SYSTEM—City, natural gas distr. sys. **$150,000.** J. E. O'Toole, Watts Bldg., Birmingham, Ala., consult. engr.

Idaho—TRANSMISSION LINE—Washington Water Power Co., W. 825 Trent St., Spokane, Wash., constr. 28 mi. new line and reframing and re-insulating 21 mi. existing 60,000-volt line to carry 110,000 volts from Lewiston to Nez Perce with 2 sub-stations. **$600,000.**

Ill., Aurora—SWIMMING POOLS—City, City Hall, swimming pools in 3 parks. **$500,000.**

Kansas—RURAL DISTRIBUTION LINES—Sumner-Cowley Electric Co-operative Assn., Wellington, 65 mi. rural distr. lines, 22 mi. tie lines, other facilities, Sumner and Cowley Counties. **$264,000.** Frank Horton & Co., Lamar, Mo., consult. engrs.

Ky., Louisville—SWIMMING POOL—City, City Hall, plans by Nevin & Morgan, Starks Bldg., 75x165 ft. swimming pool to replace present Crescent Hill Pool, **$175,000.** E. R. Ronald & Assoc., 554 S. Third St., consult. engrs. W. W. Sanders, 1426 Cypress St., engr. CD 11/10/50.

Mass., Salem—RAILROAD STATION, etc.—Boston & Maine R.R., S. G. Phillips, ch. engr., 150 Causeway St., Boston, railroad station, station bldgs., tracks, signal work, etc.

North Carolina—TELEPHONE LINES—Tri-County Telephone Membership Corp., Belhaven, 160 mi. telephone lines, Beaufort Co. **$350,000.** Southern Eng. Co., 1000 Crescent Ave. N.E., Atlanta, Ga., consult engr.

North Carolina—TELEPHONE LINES—Yadkin Valley Telephone Membership Co-op., Yadkinville, 400 mi. telephone lines, Yadkin Co. **$600,000.** L. E. Wooten & Co., 306 S. Dawson St., Raleigh, consult. engr. CD 8/3/50.

N. C., Kings Mountain—GAS DISTRIBUTION SYSTEM—City, City Hall, natural gas distr. sys. **$890,000.**

▲ **N. C., Shelby**—GAS DISTRIBUTION SYSTEM—City, City Hall, natural gas distr. sys., **$2,000,000.**

Okla., Oklahoma City—ELECTRONICS BLDG.—State Fair Assn., c/o Pete Baker, bus. mgr., c/o Fairgrounds, plans by Coston & Frankfurt, 323 E. Madison St., electronics bldg. **$170,000.** CD 5/26.

Pa., Norristown—SWIMMING POOL, etc.—Ervin Veno, 15 Swede St., plans by Francis Jobson, Valley Forge, swimming pool, bathhouse and purification plant, **$82,000;** skating rink, **$82,000.**

South Carolina—TRANSMISSION LINES—Central Electric Power Co-operative, Inc., Cornell Arms Bldg., Columbia, 85 mi. 69 KV transmission lines, Darlington, Florence, Marion, Dillon and Marlboro Counties, **$300,000;** 60 mi. 69 KV transmission lines, Berkeley, Williamsburg, Sumter, Lee and Kershaw Counties, **$200,000;** 65 mi. 69 KV transmission lines, Darlington, Marlboro and Chesterfield Counties, **$200,000.** Southern Eng. Co., 1000 Crescent Ave. N. E., Atlanta, Ga., consult. engr. CD 1/19/49.

South Carolina—TELEPHONE LINES—Farmers Telephone Corp., Kingstree, telephone lines, Florence and Clarendon Counties. **$675,000.** Thomas McCall Eng. Co., 259 Amelia St., Orangeburg, consult. engr.

▲ **South Carolina**—TELEPHONE LINES—Sandhills Rural Telephone Co-operative, Kershaw, telephone lines. **$1,000,000.** Thomas McCall Eng. Co., 259 Amelia St., Orangeburg, consult. engr.

South Carolina—TELEPHONE LINES—West Carolina Rural Telephone Co-operative, Abbeville, telephone lines, Abbeville, McCormick and Anderson Counties. **$150,000.** Southern Eng. Co., 1000 Crescent Ave. N. E., Atlanta, Ga., consult. engrs.

Tennessee—TELEPHONE LINES—Halls Cross Roads Telephone Co., Fountain City, telephone lines, Fountain City. **$250,000.** Cottrell & House, P.O. Box 6007, Nashville, consult. engrs.

▲ **Tennessee**—TELEPHONE LINES—Twin Lakes Telephone Co., Lafayette, telephone lines, Jackson, Overton and Clay Counties. **$1,500,000.** Cottrell & House, P.O. Box 6007, Nashville, consult. engrs.

Texas—GAS PIPE LINE—El Paso Natural Gas Co., Bassett Tower, El Paso, natural gas pipe line in Upton Co. to transport from fields to main line, Rankin area, Upton Co. **$454,415;** natural gas pipe line in Reagan Co. to transport from fields to a main line, Big Lake area, Reagan Co., **$344,185.** CD 2/5/53.

Tex., El Paso—GOLF COURSES—City and El Paso Co., El Paso, 18-hole golf course and clubhouse, **$125,000;** 9-hole golf course, **$75,000.** George A. Hoffman Co., 1403 S. Cherry St., San Antonio, consult. engr.

Tex., New Castle—GAS LINES, etc.—Lucien Cullen & Assocs., Electric Bldg., Houston, some field gas-gathering lines, **$100,000;** main gas pipe line exten. into Clareton Field, **$150,000.**

Tex., Raymondville—RADIO STATION—Hale Schaleben & Van N. Culpepper, 112-A South Broadway, McAllen, radio station. **$100.000.**

Tex., San Antonio—TV STATION—Walmac Co., 222 W. Commerce St., television station (Channel 12). **$150,000.**

Tex., Seminole—RADIO STATION—Seminole Broadcasters, c/o M. & C. Fornby, Seminole, radio station (KSML). **$100,000.**

Tex., Tyler—TV STATION—Luville Ross Lansing, Tyler, TV station, **$150,000.**

† **Va., Yorktown** — STEAM CONDENSATE LINES — P. Wks. Office, Fifth Naval Dist., U. S. Naval Base, Norfolk, steam condensate lines, Naval Schools. **$340,000.** Clark, Buhr & Nexsen, 208 Midtown Bldg., Norfolk, consult. engrs.

Washington—TRANSMISSION LINE—Washington Water Power Co., W. 825 Trent St., Spokane, 230,000-volt wood pole transmission line from Beacon sub-station to Bonneville Power Administration Sub-station at Mead, Spokane Co. **$462,000.**

Wis., Milwaukee—TRANSIT SHED—City Bd. Harbor Comrs., City Hall, transit shed addn. **$150,000.** CD 6/23/50.

▲ **British Columbia**—SUBMARINE CABLES—British Columbia Electric Co. Ltd., 425 Carrall Ave., Vancouver, 19 mi. four submarine cables from Vancouver to Vancouver Island (Nanaimo), and sub-stations, **$5,000,000.** D. Grauer, pres. and T. Ingledow, c/o owner, ch. engr.

▲ **Man., Winnipeg**—ARENA—Winnipeg Enterprises Ltd., c/o Moody & Moore, archts., 295 Broadway St., arena at St. Matthews and Portage Aves. **$2,000,000.**

▲ **Ontario**—RAILROAD LINE—Canadian Pacific R.R., R. A. Emerson, ch. engr., Windsor Station, Montreal, Que., 15 mi. branch line between Havelock and Nephton. **$1,500,000.**

Ont., Port Stanley—STORAGE TANKS—Imperial Fuels Ltd., J. H. McManus, owner, 263 Bathurst St., London, two 5,000,000 Imperial gal. oil storage tanks, with piping equip. for storing fuel oil. **$250,000.**

Que., Roberval—AGRICULTURAL PALACE—La Societe d' Agricultre du Comte du Roberval, Roberval agricultural palace at Exhibition Grounds, **$176,000.**

Control of DITCHER WINGS Handled by WISCONSIN Heavy-Duty *Air-Cooled* ENGINE

Wisconsin single cylinder engine mounted on Ditcher drives multi-vane hydraulic pump.

Working on a reclamation project near Pasco, Wash., this "Contractors' Special" Model 20-60 Ditcher, built by Chattin Ditcher Co., Boise, Idaho, demonstrates another interesting and effective application of Wisconsin Air-Cooled Engine Power.

In the operation of this machine, designed to cut new ditches having a bottom width of from 22 in. to 5 ft., and from 18 in. to 4½ ft. deep, with corresponding top ditch widths up to 15 ft. inside of the ditch banks . . . positive and dependable control of the double-wing blades is, of course, a "must". And for this purpose the builder has selected a 4-cycle single cylinder Wisconsin Air-Cooled Engine, to provide never-failing power to operate the Vickers multi-vane hydraulic pump.

This is a typical example of variable heavy-duty power service that calls for the kind of *Lugging Power* provided by Wisconsin Engine heavy-duty design and construction. While you may not have need for a Ditcher, you *do need* power that *keeps the job moving* no matter what kind of equipment you are using. You can depend on your Wisconsin Engines to *hang on* when variable heavy-duty loads slow down the engine speed . . . or to keep slugging away hour after hour, day after day, on continuous, constant-load jobs.

You can't do better than to specify "Wisconsin Power" for your equipment. Write for Catalog S-150 with the full story, illustrating more than 250 Wisconsin Air-Cooled Power applications.

4-cycle single-cylinder, 3 to 9 hp. models.

2-cylinder 7 to 15 hp. models.

V-type 4-cylinder 15 to 36 hp.

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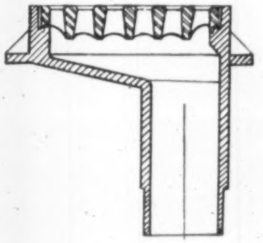

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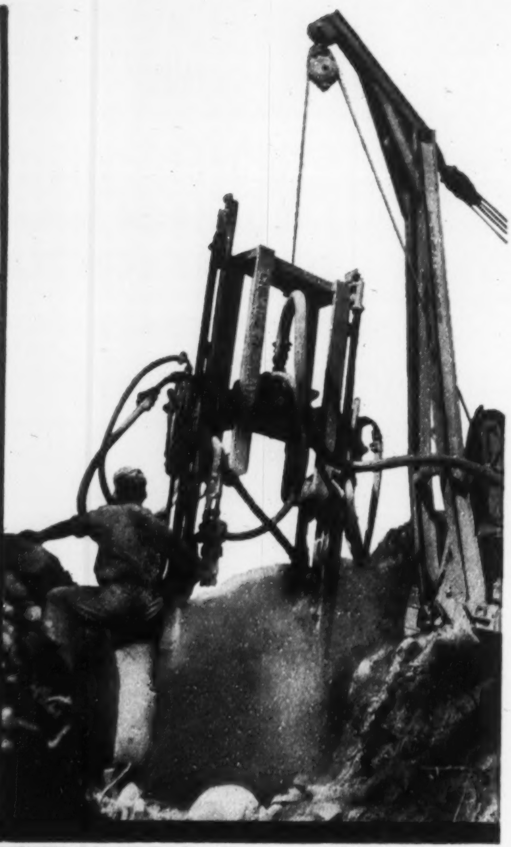

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Bids—Low Bids—Contracts—Second Section

NEW ENGLAND

BIDS ASKED—HEAVY CONSTRUCTION

STATE HIGHWAY LETTINGS
BRIDGES
February 23 Massachusetts
STREETS AND ROADS
February 23 Massachusetts

Conn., Newton—B.A. 2/24—State, Ralph G. Macy, P. Wks. Comr., State Office Bldg., Hartford, Proj. BA-A-80, sewage treatment plant addn., Fairfield State Hospital. Henry Souther Eng. Co., 11 Laurel St., Hartford, engr. CD 12/51, under Public Buildings.

† **N. H., Portsmouth**—BULK STORAGE—Bids Asked—U. S. Eng., 857 Commonwealth Ave., Boston, Mass., constr. bulk storage facilities and aircraft fueling sys., Air Force Base, ENG-19-016-54-60. Extended date. CD 1/20.

BIDS ASKED—BUILDINGS

† **Mass., Fort Devens**—THEATRE—B.A. 2/25—Contg. Officer, Fort Devens, addnl. alterations, air conditioning, Theater No. 1, Bldg. T-10.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

MAINE—Maine Turnpike Auth., 17 Bishop St., Portland,
Phoenix Bridge Co., Phoenixville, Pa. LB **$494,694**. Contr. 208 Sect. 2 steel fabrication for Androscoggin River Bridge, Augusta Exten. Portland to Augusta. (**Correction**—Low Bidder.) CD 2/3, under LB.

NEW HAMPSHIRE—State Dpt. P. Wks. & Hys., Concord,
Manchester Sand, Gravel & Cement Co., Inc., P. O. Box 536, Manchester, N. H., LB **$169,050**, asph. and peastone resurf. 68 mi. roadway, Merrimack, Rockingham and Hillsboro Counties. Bids Feb. 4. CD 1/27.

† **P. Wks. Office**, 495 Summer St., Boston, Mass. cancelled bids to have been opened Feb. 16, repairing bulkhead, USN Constr. Battalion Center, NOY 81119, Spec. 40138, DAVISVILLE, R. I. CD 1/27.

BUILDINGS

LOW BIDS AND CONTRACTS

George B. H. Macomber, 19 Milk St., Boston, Mass. CA **$350,000**. women's DORMITORY, SOMERVILLE, MASS. Tufts College, Admin. Offices, Medford, Mass. Arland A. Dirlam, 673 Boylston St., Boston, Mass., archt.

P. Wks. Office, Officer in Charge of Constr., Naval Station, Newport, R. I. Yard Labor. BUILDING 1923 addn., NOY 81093, Spec. 40116, NEWPORT, R. I. CD 1/27, under LB.

G. N. Sciarra Assoc., 354 Trumbull St., Hartford, Conn., CA, **$300,000**, 2 story, masonry OFFICE bldg., Farmington Ave. west of Front Brook, WEST HARTFORD, CONN. Brookside Realty Corp., 354 Trumbull St., Hartford, Conn. Fidelity & Casualty, 80 Maiden Lane, New York, N. Y., lessee.

MIDDLE ATLANTIC

BIDS ASKED—HEAVY CONSTRUCTION

STATE HIGHWAY LETTINGS
BRIDGES
March 2 Maryland   March 12 Pennsylvania
STREETS AND ROADS
March 2 New Jersey   March 12 Pennsylvania

† **D. C., Wash.**—ELECTRICAL SUPPLY—B.A. 2/24—Dist. P. Wks. Officer, Potomac River Naval Command, Naval Gun Factory, Wash., D. C., electrical supply addns. Building 19, first floor, at Naval Security Station, Contract NOY 81493. Plans deposit $10.

† **New York**—B.A. 2/24—U. S. Eng., 24 St. and Maryland Ave., Baltimore, Md., Monkey Run Flume, Corning, Serial CIVENG-18-020-54-26. $500,000. CD 1/22.

N. Y., Albany—B.A. 2/25—Acting U. S. Prop. & Disbursing Officer, New York State Arsenal, 201 64 St., Brooklyn, Zone 20, asphaltic concrete pavement for service center, State Armory Site, New Scotland Ave., Inv. NG-12.

N. Y., Dunkirk—GASOLINE STORAGE, FACILITIES—B.A. 2/25—Acting U. S. Property & Disbursing Officer, New York State Arsenal, 201 64th St., Brooklyn, Zone 20, gasoline storage and dispensing facilities, 325 Central Ave., Inv. NG-14.

† **N. Y., Mohawk**—GASOLINE STORAGE, FACILITIES—B.A. 2/25—Acting U. S. Property & Disbursing Officer, New York State Arsenal, 201 64th St., Brooklyn, Zone 20, gasoline storage and dispensing facilities, 83 E. Main St., Inv. NG-18.

N. Y., Newburgh—GASOLINE STORAGE, FACILITIES—B.A. 2/25—Acting U. S. Prop. & Disbursing Officer, New York State Arsenal, 201 64 St., Brooklyn, Zone 20, gasoline storage and dispensing facilities, W. William St., NG-17.

N. Y., Yonkers—GASOLINE STORAGE, FACILITIES—B.A. 2/25—Acting U. S. Property & Disbursing Officer, New York State Arsenal, 201 64 St., Brooklyn, Zone 20, gasoline storage and dispensing facilities, 127 N. Broadway, Inv. NG-13.

N. Y., Whitehall—GASOLINE STORAGE, FACILITIES—B.A. 2/25—Acting U. S. Prop. & Disbursing Officer, New York State Arsenal, 201 64 St., Brooklyn, Zone 20, gasoline storage and dispensing facilities, 62 Poultney St., Inv. NG-15.

Md., Rockville—DRAINAGE—B.A. 2/26—At office County Purch. Bureau, County Office Bldg., drainage imprvs., incl. approx. 384 lin. ft. concrete pipe-drain, 3 structures, etc., in Woodside Park. Plans deposit $5. E. T. Beall, co. mgr.

N. Y., New York—B.A. 3/3—President Manhattan Boro, Municipal Bldg., Zone 7, Contr. No. 63, alterations, imprvs. to Transverse Rd. No. 1, W. 65 St., W. 66 St. and 5th Ave., and at W. 65 St., W. 66 St. and Central Park West. Plans deposit $20.

N. Y., New York—PARK AREAS RECONSTR.—B.A. 3/3—Comr. Parks, at office Dpt. Parks, Arsenal Bldg., Central Park, 64 St. and 5th Ave., Zone 21, reconstr. park areas in connection with alteration and imprvt. to Transverse Rd. No. 1, 5th Ave., Central Park West, between 65 and 68 Sts., together with all work incidental thereto, Central Park, Manhattan Boro, Contr. M-10-1053B. Plans deposit $10.

BIDS ASKED—BUILDINGS

▲ **Md., Towson**—SCHOOL—B.A. 2/23—Baltimore Co. Bd. Educ., Aigburth Rd., masonry elementary school, Cedar Ave. and Woodward Dr., South Essex, $1,000,000. Hankins & Burton, 10 E. Mulberry St., Baltimore, archts. CD 5/8.

N. Y., Brentwood—SCHOOLS—B.A. 2/24—Bd. Educ., Union Free School Dist. 12, Brentwood School Bldg., Third Ave., two grade schools. $875,000.

▲ **N. Y., Ossining**—SCHOOLS—B.A. 3/15—Bd. Educ., Union Free School Dist. 1, Ossining, Brookside Elementary School, Pines Ridge Rd., $997,000; McMahon Elementary School, Van Cortlandt Ave., $970,000. CD 12/2.

Pa., Sarver—SCHOOL—B.A. 2/25—Buffalo Twp. School Dist., Sarver, 1 story school addn. $300,000. B. J. McCandless, 239 Fourth St., Ellwood City, archt. CD 9/17.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

Town, 1 Water St., Walton, N. Y., Own Forces. **$147,800**, 21.1 mi. Erwin Pl. Rds., WALTON, N. Y. CD 9/12/51.

PENNSYLVANIA—State Hy. Dpt., North Office Bldg., Harrisburg,
Allegheny Asphalt & Paving Co., Inc., 801 Bingham St., Pittsburgh 3, Pa., CA **$623,965**, widen 6.59 mi. pavement with crushed aggregate base and bit. surf. new base and existing pavement, constr. 7 structures, U. S. 422 in Cherry Hill and Pine Twps. between Ebensburg and Indiana, Indiana Co. Bids Jan. 26. CD 1/29, under LB.

BUILDINGS

LOW BIDS AND CONTRACTS

Glendale Homes, Inc., c/o Milton F. Kirchman, archt., 230 W. 13 St., New York 11, N. Y. Owner Builds. **$300,000**. 23 HOUSES, E. 29 St. and Avenue Z, BROOKLYN, N. Y.

▲ **Diesel Constr. Co., Inc.**, 260 Madison Ave., New York 16, N. Y., CA **$5,000,000**. BUILDING alterations, 625 Madison Ave., NEW YORK, N. Y. 625 Madison Ave. Corp., 80 Broad St., New York 4, N. Y. Sylvan Bien, 565 Fifth Ave., New York 17, N. Y., archt.

Gardner Constr. Corp., Wildwood Rd., Great Neck, N. Y. LB **$513,313**, elementary SCHOOL, Fulton and Moore Sts., OCEANSIDE, N. Y. Oceanside School Bd., Oceanside, N. Y. Bids Jan. 27. CD 1/14.

SOUTH

BIDS ASKED—HEAVY CONSTRUCTION

† **N. C., Camp Lejeune**—STEAM MAINS, etc.—B.A. 2/23—P. Wks. Office, Fifth Naval Dist., U. S. Naval Base, Norfolk, Va., rehabilitation steam mains and condensate return lines, NOY 82834. Plans deposit $10.

La., New Orleans—B.A. 2/24—City, Municipal Bldg., repairs to fender on Pier 2 of Mississippi River Bridge. CD 5/3/51.

† **Fla., Eglin Air Force Base**—CHAPEL—B.A. 2/25—U. S. Eng., P. O. Box 1169, Mobile, Zone 7, chapel addns., Eglin Air Force Base.

Fla., Naples—B.A. 3/1—City, City Hall, water treatment plant. Black & Associates, 700 S. E. 3 St., Gainsville, engrs.

† **Fla., Orlando**—SUPPLY BUILDINGS—B.A. 3/2—U. S. Eng., P. O. Box 4970 Jacksonville, supply building, group supply bldgs., salvage shed and yard jet fuel storage and secondary roads, Pinecastle Air Force Base, Serial No. Eng-08-123-54-37. Extended date. CD 1/25.

† **Fla., Eglin Air Force Base**—ROAD SURFACING, etc.—B.A. 3/9—U. S. Eng., P. O. Box 1169, Mobile 7, Ala., road surfacing, grading, etc. Elgin Air Force Base.

† **Fla., Orlando**—UNLOADING SYSTEM, etc.—B.A. On Or About 3/10—U. S. Eng., P. O. Box 4970, Jacksonville, modification of aircraft fuel unloading system and automatic fueling valves, Pinecastle Air Force Base, Serial No. Eng. 08-123-54-39. CD 1/31/51.

Tennessee—TELEPHONE LINES—B.A. 3/16—Cherokee Telephone Co-op, Mountain City, telephone lines. Johnson and Carter Counties. Approx. $300,000. CD 2/2.

BIDS ASKED—BUILDINGS

Va., Bedford—ACADEMY—B.A. 2/25—Bedford & Campbell County School Bds., Bedford, New London Academy. Plans deposit $11. S. S. Johnson, Allied Arts Bldg., Lynchburg, archt.

Va., Lawrenceville—HIGH SCHOOL—B.A. 3/3—Brunswick Co. School Bd., Lawrenceville, Brunswick County High School. Plans deposit $25. Dixon & Norman, 1103 E. Main St., Richmond, archts. CD 12/21.

▲ **Va., Norfolk**—HIGH SCHOOL—B.A. 3/12—Norfolk Co. School Bd., 148 Granby St., 1 story, masonry Deep Creek High School. $1,000,000. Plans deposit $50. Lublin, McGaughy & Assocs., 220 W. Freemason St., archts. CD 7/31.

Va., Harrisonburg—SCHOOL—B.A. 3/18—City of Harrisonburg School Bd., Harrisonburg, Keister Elementary School addns, atlerations. Plans deposit $25. C. Wenger, 20 S. Liberty St., archt. CD 8/18.

SOON LETS CONTRACT—BUILDINGS

Fla., Coral Gables—OFFICE—Ponce Alhambra Inc., 232 Alhambra Circle, soon lets contract office bldg. addn. $300,000. Curtis E. Haley, 204 Aragon Ave., archt.

Fla., Miami—SERVICE STATION, etc.—Bessemer Properties, Inc., 1317 Biscayne Blvd., soon lets contract super service station and warehouse for Firestone Tire & Rubber Co., Akron, $100,000.

Ga., Chamblee—WAREHOUSE—Anchor Post Products, Inc., Chamblee, soon lets contract warehouse, $100,000. David S. Cuttino, Jr. & Assocs., Mortgage Guarantee Bldg., Atlanta, archts. CD 1/29.

Va., Fairfax—SCHOOL—St. Johns Church, El Nido, Fairfax, soon lets contract, 1 story, 119x244 ft. school, library and kitchen, at El Nido. Soule & Donnally, 7206 Aberdeen Rd., Bethesda, Md., archts.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

VIRGINIA—State Hy. Dpt., 1221 E. Broad St., Richmond,
A. B. Burton Co., Lynchburg, Va., CA **$973,496**. 2.83 mi. two-lane, rein.-con. paving and two bridges, Rte. 29 and 29-A, Proj. 4605-07-07; 4615-03-4-05, Group No. 43, Amherst Co. Bids Jan. 27. CD 2/2, under LB.

Modern Welding Co., Owensboro, Ky., CA **$750,000**. natural gas distr. sys., LEXINGTON, N. C. City, Lexington, N. C. CD 3/6, under LB.

Chicago Bridge & Iron Co., 57 Forsyth St., Atlanta, Ga. CA **$53,000**, 200,000 gal. elevated steel water tank, PILOT MOUNTAIN, N. C. Town, Pilot Mountain, N. C. Bids Feb. 2. CD 1/27.

Ben. H. Martin, Easley, S. C. CA **$62,000**. Swimming pool, PICKENS, S. C. Pickens Country Club, Pickens, S. C.

Atlanta Gas Light Co., Peachtree St., Atlanta, Ga., Force Account, **$140,000**, natural gas lines in Ben Hill Area. ATLANTA, GA.

City, City Hall, Homerville, Ga. Owner Builds, **$90,000**, sanitary sewer imprvs., HOMERVILLE, GA. CD 2/5. J. B. McCrary Co., Atlanta Federal Savings Bldg., Atlanta, Ga., consult. engr. C 2/5.

† **Eaton & Elzea Constr. Co.**, P. O. Box 775, Panama City, Fla., LB, **$324,166**, shop addn., A/C maintenance flight simulator bldg. and misc. P.O.L. facilities, Tyndall Air Force Base, Inv. 54-33, PANAMA CITY, FLA. U. S. Eng., P. O. Box 1169, Mobile 7, Ala.

Roy Development Co., Siesta Key Rd., Sarasota, Fla., Owner Builds, **$50,000** seawall, SARASOTA, FLA.

Geo. Brown, 1507 W. Hillview Ave., Sarasota, Fla., CA, **$150,000**, electric SUB-STATION, Lime Ave., SARASOTA, FLA. Florida Light & Power Co., Sarasota, Fla

Barnet Brezner, P. O. Drawer 1030, Alexandria, La., CA **$89,455**, swimming pool, Broadway Park, ALEXANDRIA, LA. City, City Hall, Alexandria, La. Bids Feb. 1. CD 1/26.

Carruth Contg. Co., 3170 Florida St., Baton Rouge, La. CA **$60,000**. culvert in Monte Sano Bayou, BATON ROUGE, LA. Kaiser Aluminum & Chemical Corp., Airline Hy., Baton Rouge, La.

White Constr. Co., P. O. Box 994, Lafayette, La., CA, **$172,255**, Street Paving Project 54-01, LAKE CHARLES, LA. City, City Hall, Lake Charles, La. Bids Feb. 3. CD 1/26.

Moncla Constr. Co., P. O. Box 3062, Shreveport, La. CA **$58,844**, install 2 pumps, Cross Lake Pumping Station, SHREVEPORT, LA. City, City Hall, Shreveport, La. CD 1/27.

▲ **TENNESSEE**—State Hy. Dpt., Nashville,
Warren Bros. Roads Co., 1900 Hayes St., Nashville, Tenn., LB **$340,393**, bit. material surf. of slightly more than 9 mi. St. Rte. 6, from approx. 1 mi. north of Columbia and extending through Spring Hill, Maury Co.;

Townsend & Peavyhouse, Parsons, Tenn., LB **$94,749**, grading, drainage, surf., constr. concrete box type bridge 6.507 mi. Secondary Rte. 8029 from Crockett Mills north to near the Gibson county line, Crockett Co.;

Knoxville Constr. Co., River Terminal Rd., Knoxville, Tenn., LB **$198,039**, bit. materials paving 5.54 mi. St. Rt. 1, from Rutledge toward Tate Springs, Grainger Co.;

W. P. McClanahan, Centerville, Tenn., LB **$229,909**, grading, drainage, surf., constr. 4 bridges 8.307 mi. Secondary Rte. 8123 from St. Rt. 15 at Crump north to Morris Chapel, Hardin Co.;

L. & M. Constr. Co., 843 Vance Ave., Memphis, Tenn., LB **$77,823**, grading, drainage, surf. 6.531 mi. Rte.

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Pumping: Wellpoint Dewatering Corp.

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8047 from Secondary Rte. 8046 at Orsya to St. Rte. 19 near Ripley, Lauderdale Co.;

Wright Contg. Co., 504 24th Ave., Columbus, Ga. LB **$394,308**, bit. materials paving 10.759 mi. St. Rte. 26 from the DeKalb Co. line to St. Rte. 1 in Sparta, White Co.

BUILDINGS

LOW BIDS AND CONTRACTS

J. H. Poladian, 2415 Mt. Vernon Ave., Alexandria, Va. Owner Builds. Approx. **$350,000**. 77 three story masonry APARTMENT unit, ALEXANDRIA, VA.

C. L. Lewis & Co., Inc., Lynchburg, Va., LB **$433,489**, new city COURT HOUSE, LYNCHBURG, VA. City, City Hall, Lynchburg, Va. Bids Feb. 5. CD 1/13.

Wagoner Constr. Co., Salisbury, N. C. CA, **$300,000**. DORMITORY, SALISBURY, N. C. Livingston College, Salisbury, N. C. CD 11/2.

Strother-Barge Co., 189 Cain St. N.E., Atlanta, Ga. LB, **$677,000**. CAFETERIA addns., alterations ATLANTA, GA. S&W Cafeteria, Peachtree St., Atlanta, Ga.

Mixon Milling Co., Camilla, Ga. Owner Builds, **$85,000**, PLANT addn., CAMILLA, GA.

R. H. Wright Jr. & Associates, 3026 Colorado St., Columbus, Ga. Owner Builds, **$320,000**, 40 RESIDENCES, COLUMBUS, GA.

B. O. Thurston Co., Gainesville, Ga., CA, **$410,000**, SCHOOL, FOLKSTON, GA. Charlton Co. Bd. Educ., Folkston, Ga. Bids Jan. 26. CD 12/29.

James A. Henderson, 4015 Laguna St., Coral Gables, Fla. Owner Builds, **$85,000** PLANT addn., CORAL GABLES, FLA.

Arkin Constr. Co., 1827 Purdy Ave., Miami Beach, Fla., CA, **$350,000**, TEMPLE, MIAMI BEACH, FLA. Temple Beth Sholom, 4144 Chase Ave.. Miami Beach, Fla.

Frank J. Rooney, Inc., 5880 N.E. 4 Ave., Miami, Fla., CA, **$85,000** AUTO SALES and SERVICE BLDG. MIAMI, FLA. Sam Murray, Inc., 1917 Biscayne Blvd., Miami, Fla.

Spector & Sons, 575 S.W. 22 Ave., Miami, Fla. Owner Builds, **$200,000**, PLANT, 3301 N.W. 73 St., MIAMI, FLA.

Dempsey Constr. Co., 3372 N.W. 17 Ave., Miami, Fla., CA, **$85,000** WAREHOUSE, MIAMI, FLA. Gordon Poindexter & E. D. Junco, 3972 N.W. 25 St., Miami, Fla.

Duffey Constr. Co., 1395 N.W. 21 St., Miami, Fla., CA, **$151,837**, AUTO SALES and SERVICE BLDG. MIAMI, FLA. J. D. Ball Motors, 9000 Central Blvd., Miami, Fla. Bids Feb. 1. CD 1/28.

Gelvan Const. Co., 254 E 5 St., Hialeah, Fla., Owner Builds, **$125,000**. WAREHOUSE, MIAMI, FLA.

Horace B. Rickey, Inc., P.O. Box 218, Lafayette, La. CA **$360,000**. OFFICE bldg. addn., LAFAYETTE, LA. Maurice Heymann, Lafayette, La. CD 11/17.

George J. Glover Co., Inc., Whitney Bldg., New Orleans, La., CA. **$100,000**. bottling PLANT addn., NEW ORLEANS, LA. New Orleans Coca Cola Co., 123 Canal St., New Orleans, La. A. W. Thompson & Assocs., Cotton Exchange Bldg., New Orleans, La., engrs

Waltham Development Co, 802 Perdido St., New Orleans, La. Owner Builds. **$325,000**. 40 RESIDENCES, NEW ORLEANS, LA.

Kelly Constr. Co., 818 Cardinal St., Shreveport, La. Owner Builds. **$300,000**. 32 RESIDENCES, SHREVEPORT, LA.

MIDDLE WEST

BIDS ASKED—HEAVY CONSTRUCTION

Wis., **Brillion**—B.A. 2/25—City, deep well and 180,000 gal. rein.-con. underground reservoir, $54,500. McMahon Eng. Co., Menasha, engrs.

Wis., **Shorewood**—B.A. 2/25—Village, 3930 N. Murray Ave., Milwaukee, Zone 11, 14,000 ft. 15- to 60-in. storm sewers. Plans deposit $10. Consoer, Townsend & Assocs., 351 E. Ohio Ave., Chicago 11, Ill., engrs. CD 1/20.

† **Illinois**—B.A. 3/4—U. S. Eng., 420 Locust St., St. Louis 2, Mo. road surfacing on levees, Proj. Item II-L, Grand Tower Drainage and Levee District, Jackson Co., CIVENG-23-065-54-83. CD 12/8/52.

† Wis., **Baraboo**—PROTECTION SYSTEM—B.A. 3/4—U. S. Eng., Office of Resident Engineer, Badger Ordnance Werks, Baraboo, lightning protection systems, at Badger Ordnance Works, Serial No. ENG-47-013-54-11. Extended date. CD 1/26.

† Wis., **Baraboo**—LIME SILO, etc.—B.A. 3/9—U. S. Eng., Office of Resident Engineer, Badger Ordnance Works, Baraboo, lime silo and acid brick pits, Badger Ordnance Works, Serial No. ENG-47-013-54-10. Extended date. CD 1/19.

BIDS ASKED—BUILDINGS

Wis., **Jefferson**—PLANT—B.A. 2/24—Albers Milling Co. (Subsidiary of Carnation Milk Co.,) 5045 Wilshire Blvd., Los Angeles, Calif., 60x100 ft. and 50x100 ft. grain plant addn.

▲ O., **Columbus**—EXCHANGE—B.A. 3/3—Ohio Bell Telephone Co., 42 E. Gay St., 4 story, two-bsmnt., 188x188 ft. bldg. with foundation strong enough for 13-floor structure. Est. $4,000,000-$5,000,000. Tibbals-Crumley-Musson, 965 E. Broad St., archts. CD 6/8.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

Burger & Vicker, 300 4 Ave., Stevesn Point, Wis., **LB, $223,722**, sewage treatment plant;

Farmer Brothers, Tomah, Wis., LB, **$196,030, sewers** and force main, MERRILL, WIS. City, Merrill, **Wis.** Bids Jan. 25. CD 12/16.

Chandler-Bass, Inc., 8145 Medina St., Detroit, **Mich.**, CA, **$174,400**, concrete, steel pier, GROSSE POINTE, MICH. City, 17150 Maumee Ave., Grosse Pointe, **Mich.** Bids Jan. 15.

BUILDINGS

LOW BIDS AND CONTRACTS

Philip DiCiocco Constr. Co., Western Reserve Rd., Youngstown, O., CA **$300,000**. ELEMENTARY SCHOOL **and** GYMNASIUM, AUDITORIUM BLDG., NILES, O. St. Stephen's Church, Niles, O. Awarded Feb. 5. CD 4/24/51.

▲† **Gustav Hirsch Organization, Inc.**, 1347 W. 5 Ave., Columbus, O., CA **$104,700**, switchyard and substation;

Columbus Heating & Ventilating Co., 182 N. Vale St., Columbus, O., CA **$109,970**, air-conditioning sys.;

Federal Electric Products Co., Crescent St., Long Island City, N. Y., CA **$129,290**, auxiliary power unit substations; CA **$205,000**, unit sub-station; CA **$139,960**, operator control centers;

Consolidated Welding & Engineering Co., 2450 S. Ashland St., Chicago, Ill., CA **$42,569**, stairs, ladders and bridge for a process bldg.; CA **$1,150,515**, insulated panels and related material for process bldg.;

Bloomer Heating & Ventilating Co., 1237 W. 47 St., Chicago, Ill., CA **$438,840**, ventilating ductwork;

Decatur Iron & Steel Co., Decatur, Ala., CA **$166,846**, misc. iron for process bldg.;

Morgan Bros. Co., 7227 Tioga St., Pittsburgh, Pa., **CA $487,183**, ventilating sys. ductwork;

C. J. Carlson Co., Inc., 2701 Roosevelt St., Indianapolis, Ind., CA **$741,690**, ventilating systems ductwork;

Gichner, Inc., 1900 Kendall St. N. E., Wash., D. C., **CA $729,413**, ventilating systems ductwork;

Westinghouse Electric Corp., 207 W. 3 St., Cincinnati, O., CA **$54,819**, auxiliary power control panels;

A. O. Smith Corp., 3533 N. 27 St., Milwaukee, Wis., CA **$1,939,096**, condensers for a PROCESS BLDG. (subcontractors under Peter Kiewit Sons' Co., P.O. Box 268, Portsmouth, O.) for Atomic Energy Comn., 1901 Constitution Ave. N. W., Wash. 25, D. C., PIKETON and WAKEFIELD, O. Grand total $6,439,891. CD 8/13/52, under CA.

Dunlap & Co., Builders, Columbus, Ind., Owner Builds, **$500,000**, HOMES, and streets, COLUMBUS, IND.

Nathaniel C. Reed Constr. Co., 6734 Longmeadow St., Lincolnwood, Ill. Own Forces. **$500,000**, 25 HOMES, LINCOLNWOOD, ILL.

▲ **Haglund & Ames**, 123 Greenwood Ave., Waukegan, Ill., CA, general contract;

American Bridge Co., 208 S. La Salle St., Chicago 4, Ill., steel contract for FACTORY, WAREHOUSE, WAUKEGAN, ILL. Johns-Manville Corp., 22 E. 40 St., New York 16, N. Y. Total est. **$3,000,000**. Awarded Feb. 1. CD 10/14.

Chas. D. Smith & Son, Inc., Hy. 23, Fond du Lac, Wis., CA, **$704,810**, general contract 1 story, irregular 400x300 ft. overall East Side Junior High SCHOOL OSHKOSH, WIS. Bd. Educ., Oshkosh, Wis. Bids Jan. 27. CD 1/4.

Ellis Constr. Co., 16803 Greenfield St., Detroit, Mich., CA, **$640,000**, Pointe Tremble, Fair Haven and High SCHOOLS, ALGONAC, MICH. Bd. Educ., Roy T. Gilbert, secy., 1215 Washington St., Algonac, Mich. Bids Dec. 21. CD 12/10.

Baker, VanderVeen, DeYoung & Kraker, 3640 Clyde Park S.W., Grand Rapids, Mich. CA **$432,780**. SERVICE BLDG. for public school sys., GRAND RAPIDS, MICH. City, Bd. Educ., 143 Bostwick Ave., Grand Rapids, Mich. Bids Jan. 26. CD 1/4.

WEST OF MISSISSIPPI

BIDS ASKED—HEAVY CONSTRUCTION

STATE HIGHWAY LETTINGS

BRIDGES
March 2 Montana

STREETS AND ROADS
February 23 Kansas **March 23 Montana**

† **Minn., Minneapolis**—GROUNDED ELECTRICAL SYSTEM—B.A. 2/25—U. S. Eng., 1709 Jackson St., Omaha, Neb., grounded electrical system, Building 501, Twin Cities Arsenal, Inv. 25-066-54-63. CD 5/14/53, under Public Buildings.

† **Oklahoma**—B.A. 3/1—U. S. Eng., 100 W. Vickery St., Fort Worth, Tex., U. S. Soil Conservation Service-Floodwater Retarding Structures on Barnitz Creek, Washita River Watershed, Inv. 97-54, Custer Co. $75,000. Extended date. CD 1/25.

Tex., Dallas—B.A. 3/1—City, City Hall, Main and Harwood Sts., storm sewer, 7½ ft. diam., from Central and Grand and go to Trinity River, through S. Dallas. $775,000. Extended date. Koch & Fowler, 3900 Lemmon St., engrs. CD 2/10.

† **Colorado**—SUB-STATION—B.A. 3/4—Bureau Reclamation, Dpt. Interior, Loveland, Brighton Sub-station addns., Colorado-Big Thompson Project, Spec. 704C-330. L. N. McClellan, Bldg. 1A, Denver Federal Center, Denver, ch. engr.

† **Mo., Grandview**—GASOLINE FACILITIES—B.A. 3/4—U. S. Eng., Davidson Bldg., Kansas City, Mo., AFRTC aviation gasoline facilities, Grandview Air Force Base, INV-23-028-54-40. CD 6/30/52.

† **Tex., Austin**—WATER PUMP STATION—B.A. 3/4—U. S. Eng., 100 W. Vickery St., Fort Worth, water pump station, steel elevated water storage tank, Bergstrom Air Force Base, Inv. No. Eng-41-443-54-33. CD 9/26/51.

† **Tex., Austin**—FUEL STORAGE—B.A. 3/5—U. S. Eng., 100 W. Vickery St., Fort Worth, addnl. bulk fuel storage facilities, Bergstrom Air Force Base, Inv. No. ENG-41-443-54-38. CD 5/14, under LB.

† **Tex., Fort Hood**—B.A. 3/5—U. S. Eng., 100 W. Vickery St., Fort Worth, 1 m.g. elevated water supply-storage tank, Inv. No. ENG-41-443-54-39. CD 9/15/52, under Public Buildings.

† **Tex., Fort Hood**—B.A. 3/9—U. S. Eng., 100 W. Vickery St., Fort Worth, 30 in. water line (from Belton Reservoir), Inv. No. ENG-41-443-54-34. Extended date. CD 1/29.

† **South Dakota**—TRANSFORMERS—B.A. 3/23—Bureau Reclamation, Dpt. Interior, Bldg. 53, Denver Federal Center, Denver 2, Colo., one 110,000 ungrounded wye-to 4, 160 wye/2,400x12,470 wye/7,200-to 7,200 delta-volt, 3-winding, 3-phase 60-cycle, class OA, outdoor power transformer, with high voltage, low-voltage and tertiary-voltage windings having capacities of 10,000 kva, 6,000 kva and 4,000 kva (external load), respectively, and with tank-mounted lightning arresters and bushing-type current transformers for Pierre Sub-station, Transmission Div., Inv. No. DS 4117.

▲† **Iowa**—B.A. 4/8—U. S. Eng., Clock Tower Bldg., Rock Island, Ill. New Lock No. 19, Stage 2, at Mississippi River, Keokuk, Inv. 11-117-54-25. CD 12/15/52.

BIDS ASKED—BUILDINGS

Minn., **West St. Paul**—SCHOOL, etc.—B.A. 2/24—St. Michaels Convent, c/o Shifflet, Townsend & Carter, archts., 17 West Franklin Ave., school and convent house for 15 sisters, $400,000. CD 11/25.

Minn., **Coleraine**—SCHOOL—B.A. 2/25—Bd. Educ., R. C. Clarson, clk., 2 story grade school, over $300,000. Plans deposit $25. Jyring & Jurenes, Hibbing, archts.

Minn., **Roseville** (St. Paul P.O.)—SCHOOL—B.A. 3/2—Bd. Educ., Independent School District No. 3, Ramsey Co., Alexander Ramsey, clk., High School, Hy. 36 and Dellwood Ave., Roseville, Lexington, Falcon Heights and Lake Owasso Grade Schools Addns. $800,000. Magney, Tusler & Setter, 202 Foshay Tower, Minneapolis, archts. Site changed. CD 10/20, under Minn., Lauderdale.

Tex., **Amarillo**—HIGH SCHOOL—B.A. 3/9—Amarillo Independent School Dist., Amarillo, Junior High School. $550,000. Dr. N. L. Engelhardt, c/o Engelhardt, Engelhardt & Leggett, 551 Fifth Ave., New York, N. Y. and Robert E. Hucker, Johnson Bldg., archts. CD 11/13.

▲ Ark., **Fayetteville**—ANIMAL SCIENCE—B.A. 3/10—University of Arkansas, Fayetteville, 2 story, brick, five wing animal science bldg. at University of Arkansas. $1,500,000. Ginocchio-Cromwell & Assocs., Hall Bldg., Little Rock, archts. CD 6/24.

Tex., Dallas—WAREHOUSE, etc.—Bids Asked—Roddis Lumber & Veneer Co., 2800 Medill St., 1 story, 200x228 ft. masonry warehouse—small office. $375,000. Alexander & Russell, Ltd., 6433 Bob-O-Lings St., Dallas, archts. CD 2/3.

Tex., Odessa—HIGH SCHOOL—B.A. 3/16—Ector Co. Independent School Dist., D. M. Hawkins, pres. bd., Odessa, 1 story, brick, tile concrete haydite block; asph. tile Bonham Junior High School. $900,000. Plans deposit $25. Wilson, Patterson & Assocs., 202 Majestic Bldg., Fort Worth, archts. CD 8/24.

Tex., Houston—PLANT—Bids Asked—Moore Rice Dryer, Inc., 1314 Prairie St., rice dryer plant, 20 mi. northwest of here, $200,000. CD 2/5.

Tex., Houston—COMMERCIAL—Bids Asked—B. B. Sembera, 4661 Telephone Rd., 2 story masonry commercial bldg., $300,000. CD 1/29.

SOON LETS CONTRACT—BUILDINGS

Kan., Shawnee—TRAINING BLDG.—General Motors Corp., General Motors Bldg., Detroit, Mich., soon lets contract, training center bldg. $500,000. Smith-Hinchman & Grylls, Inc., 800 Marquette Bldg., Detroit, Mich. archt. CD 1/12.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲ † **Steenberg Constr. Co.**, 1371 Marshall Ave., St. Paul 4, Minn., LB **$2,008,320**, hospital, Ellsworth Air Force Base, Inv. 25-066-54-27, RAPID CITY, S. D. U. S. Eng., 1709 Jackson St., Omaha, Neb. Bids Feb. 4.

† **L. W. Hayes, Inc.**, 4550 Main St., Kansas City, Mo. LB **$173,045**, underseepage control and Doniphan Creek diversion, near Doniphan, Inv. 23-028-54-80, KANSAS. U. S. Eng., Davidson Bldg., Kansas City, Mo. Bids Jan. 29. CD 1/6.

Admiral Paving Co., 1840 Admiral St., Tulsa, Okla., CA, **$164,862**, est. $183,520, 2 mi. widening Riverside Dr., TULSA, OKLA. City, City Hall, Tulsa, Okla. W. W. Wooten, Tulsa, Okla., city engr. Awarded Feb. 4. CD 3/5/52.

Lighthouse Electric Corp., Floydada, Tex. Own Forces. **$350,000**, laying new pole line extens; **$60,000**, sys. line rehabilitation and replacements, Floydada, Co., TEXAS. CD 1/29.

▲† **R. G. Le Tourneau, Inc.**, Longview, Tex., LB **$2,016,882**, Items 1, 3, 4, 5, 6;
W. K. Ingram Constr. Co., West Memphis, Ark., LB **$324,592.** Item **2,** for relocation St. Louis South-

Model 120-P

Powered by CHRYSLER Industrial Engine

Smith 120-P air compressor

Operates all these tools—for less!

- ✓ Two 80-lb. paving breakers.
- ✓ Two 80-lb. sheeting drivers.
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- ✓ Four backfill tampers, or two concrete vibrators.

Write for complete facts and names of nearest dealer!

CUTTING COSTS FOR CONTRACTORS—Maine to California!

The Smith 120-P gives operating economy that big compressors can't approach. Goes where big, bulky compressors can't go. Powered by heavy-duty Chrysler Model 22 Industrial Engine. Simple, compact design—minimum fittings, gaskets, etc. to break down or cause trouble. No couplings, no clutch. Finned aftercooler reduces air temperature approx. 200°, gives longer hose life!

Also the Smith 70-P Compressor

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CEMENT GUN CO. USES "GUNITE"

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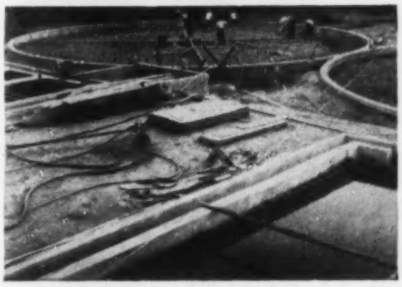

The top photo shows badly disintegrated concrete Imhoff Tank of a small New Jersey Sewage Disposal Plant. The repairs involved removal and rebuilding of two walls of this tank in their entirety, together with the relining of the tank with two inch "GUNITE".

The two trickling filters were also repaired with "GUNITE" to a thickness of two inches both inside and outside, as well as rebuilding sections of the circular wall. On the interior of the trickling filters the "GUNITE" was carried down eighteen inches below rock line.

The repairs illustrated above have restored the Plant at small expense to original design.

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"GUNITE" CONTRACTORS
GENERAL OFFICES – ALLENTOWN, PA., U. S. A.

MANUFACTURERS OF THE "CEMENT GUN"

western Ry. embarkment between Texarkana and Naples, in Bowie and Cass Counties Inv. No. 54-112, TEXAS. U. S. Eng., foot of Prytania St., New Orleans, La. Bids Feb. 2.

City, City Hall, Main and Harwood Sts., Dallas, Tex. Force Account. **$150,000,** some misc. sanitary sewer lines; **$125,000,** some misc. storm sewer lines, DALLAS, TEX. J. T. Conroy, P. Wks. engr. CD 11/21/51.

City, City Hall, Fort Worth, Tex., Force Account. **$100,000.** some water distr. lines, Southside, FORT WORTH, TEX. C. M. Thelin, dir. P. Wks. CD 2/1.

R. W. Smith Constr. Co., Box 14053, Houston, Tex., LB **$162,210,** est. $180,000, sanitary sewer and appurtenances in connection with Jensen Dr. area trunk sanitary sewers of Schuller Rd., HOUSTON, TEX. City, City Hall, 900 Brazos St., Houston, Tex. Frank Baldwin, dir. City P. Wks. Bids Jan. 29.

Clyde Yarbrough, 904 W. 22nd St., Odessa, Tex., LB **$132,715,** water supply lines, McCAMEY, TEX. Upton Co., Comrs. Court, McCamey, Tex. CD 1/29.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ **Hagstrom Constr. Co.,** 1567 Selby Ave., Minneapolis, Minn., CA, **$1,007,100.** general contract Hazel Park Junior High SCHOOL, White Bear and Maryland Aves., ST. PAUL, MINN. Bd. Educ., 253 City Hall, St. Paul, Minn. Bids Jan. 6. CD 2/8, under LB.

Roberts Constr. Co., Sabetha, Kan., CA **$160,000.** GRAIN ELEVATOR, NORTON, KAN. Ralph Reich Grain Co., Norton, Kan.

Wm. N. Floyd & Assocs., 5100 Fannin St., Houston, Tex. CA **$319,500,** 21 brick DWELLINGS, concrete slab fdn. BELLAIRE, TEX. Robert C. Kuldell, 5100 Fannin St., Houston, Tex. CD 7/10.

Conroe Community Hotel, Inc., Conroe, Tex. cancelled bids to have been opened Feb. 23, 2 story, 35,000 sq. ft., concrete lift-slab type constr. HOTEL, CONROE, TEX. **$500,000.** CD 1/19.

Wiley Roberts & Sons, 1922 W. Jefferson St., Dallas, Tex. Owner Builds. **$325,000.** 10 brick DWELLINGS, concrete slab fdn.; **$345,100,** 16 brick, masonry DWELLINGS, DALLAS, TEX. CD 10/21.

Mardian Constr. Co., Box 1032, Phoenix, Ariz. CA Approx. **$500,000.** design and construct, EQUIPMENT BLDG. DALLAS, TEX. Darr Equipment Co., 1137 S. Lamar St., Dallas, Tex. CD 2/9.

Sherley-Anderson-Pittman, Inc., Farwell, Tex. Owner Builds. **$238,750,** 500,000 bu. GRAIN ELEVATOR, FARWELL, TEX. CD 2/3.

▲ **Fletcher & Harlock, Builders,** c/o Almeda-Genoa Rds., Houston, Tex. Owner Builds. **$368,000.** 18 brick DWELLINGS, concrete slab fdn.; **$300,000,** 11 brick, masonry DWELLINGS, concrete slab fdn.; **$391,000,** 20 masonry rambling type DWELLINGS, concrete slab fdn., HOUSTON, TEX. Grand total $1,059,000. CD 1/27.

Frank Ogren Building Co., 2519 Huldy St., Houston, Tex. CA **$308,500,** 6 masonry rambling type DWELLINGS: **$361,115,** 23 DWELLINGS, HOUSTON, TEX. Frank Ogren, 2519 Huldy St., Houston, Tex. CD 1/29.

W. D. Ferguson & Son, Box 446, Brownsville, Tex., LB **$380,000.** brick exterior Junior HIGH SCHOOL, concrete beam and slab fdn., KINGSVILLE, TEX. Kingsville Independent School Dist., Kingsville, Tex. Lynn A. Evans & O. Roy Abbott, Bevly Blvd., Corpus Christi, Tex. archts. H. P. Mcelhaney, Wilson Tower, Corpus Christi, and T. A. Vernor, Taft, Tex., engrs. Bids Feb. 2.

▲ **W. D. Ferguson & Sons,** Box 446, Brownsville, Tex. CA **$1,632,300,** general constr. without auditorium 2 story Junior HIGH SCHOOL, LUBBOCK, TEX. Lubbock Independent School Dist., Lubbock, Tex. Bids Jan. 26. CD 2/1, under LB.

Tidmore Constr. Co., 1902 Avenue M, Lubbock, Tex., CA **$392,000.** adding 57,000 sq. ft. to SHOPPING CENTER, LUBBOCK, TEX. W. B. Blankenship, 1902 Avenue M, Lubbock, Tex. CD 2/2.

Frank A. Miceli, 710 Avenue A, San Antonio, Tex., LB **$104,977,** masonry SHOPS, 1110 Austin St., SAN ANTONIO, TEX. San Antonio Independent School Dist., Lavaca and Matagorda Sts., San Antonio, Tex. Frank T. Drought, 342 W. Woodlawn St., and G. M. Baker, 342 W. Woodlawn St., San Antonio, Tex., engrs. CD 1/14.

Ray Ellison, Builder, 1650 W. Mulberry St., San Antonio, Tex. Owner Builds. **$327,175,** 33 DWELLINGS, SAN ANTONIO, TEX. CD 1/29.

Robert E. McKee, General Contractor, Inc., Box 1706, Santa Fe, N. M., CA **$349,700.** first phase of new PENITENTIARY, SANTA FE, N. M. State of N. M. Santa Fe, N. M. Bids Jan. 19. CD 1/26.

FAR WEST

BIDS ASKED—HEAVY CONSTRUCTION

STATE HIGHWAY LETTINGS

STREETS AND ROADS

February 25 Nevada

† **Washington**—SHEET PILING—B.A. 2/25—Bonneville Power Admin., 827 N.E. Oregon St., Portland, Ore. installing steel sheet piling for flood protection to Tower 61, Vancouver-Kelso 230 kv line, Clark Co., Inv. 7264. L. C. Stewart, 827 N.E. Oregon St., Portland, Ore., engr. CD 2/5/51.

Calif., Spadra—B.A. 3/3—State Div. Architecture, 1100 S. Grand Ave., Los Angeles, 12 new ward site development, constr. underpass at Pacific Colony. Plans deposit $25.

† **Washington**—B.A. 3/4—Bonneville Power Admin., 827 N.E. Oregon St., Portland, Ore., grade entrance roads and switchyard, Chief Joseph Sub-station, Inv. 7270, Douglas Co. Plans deposit $5. L. C. Stewart, 827 N.E. Oregon St., Portland, Ore., engr. CD 2/5/51, under Unclassified.

† **Wash., Everett**—FLIGHT SIMULATOR—B.A. 3/5—Dpt. Army, Purch. & Contg. Officer, Paine Air Force Base, 1 story, 37x54 ft., masonry flight-simulator bldg., Paine Air Force Base, Inv. 54-14. Extended date. CD 1/8.

† **Wash., Moses Lake**—PUMP PLANT—B.A. 3/11—U. S. Eng., City-County Airport, Walla Walla, water pump plant, Larson Air Force Base, Eng-45-165-54-14. F. S. Tandy, City-County Airport, Walla Walla, engr. CD 1/5.

BIDS ASKED—BUILDINGS

Wash., Richland—SCHOOL—B.A. 2/25—School District 400, Richland ,2 story 93x266 ft. steel, Columbia High School addn. $750,000. Plans deposit $50. J. W. Mahoney & J. H. Whitney, Larson Bldg., Yakima, archts. CD 7/6.

Ore., Corvallis—CHEMICAL ENGINEERING—B.A. 3/8—State Bd. Higher Educ., University of Oregon, Eugene, 3 story, bsmnt., rein.-con. chemical engineering bldg., Oregon State College. Plans deposit $50. Herman Brookman, 1728 N.W. 32 St., Portland, archt.

▲ **Calif., San Francisco**—OFFICE—Bids Asked—Mutual Life Insurance Co., 660 Market St., (selected list bidders) 4 story mezzanine, penthouse and terrace area office, Kearney and California Sts. $1,500,000. W. D. Peugh & W. B. Glynn and A. J. Loubet, assoc., 333 Montgomery St., archts. CD 8/12.

SOON LETS CONTRACT—BUILDINGS

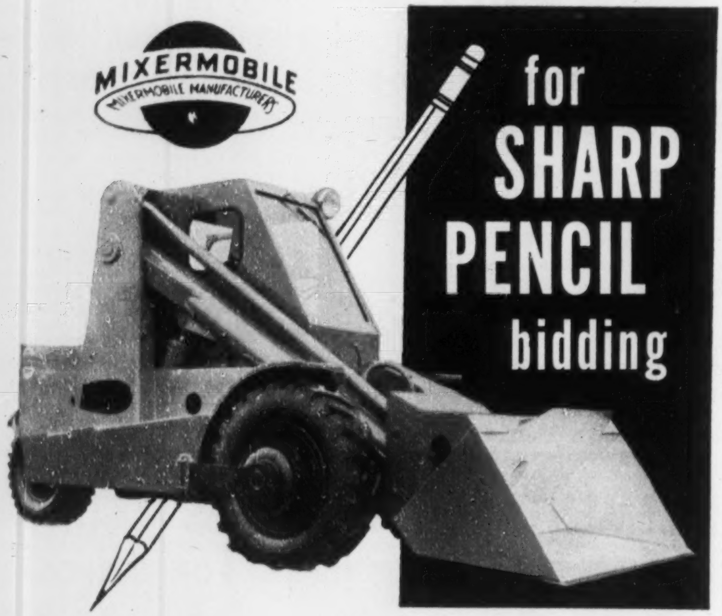
Calif., Nimbus—BUILDINGS—Aerojet-General Corp., Nimbus, soon lets contract 4 buildings, roads, revetments, electric lines, etc. at Company Plant here.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

† **Moloney Electric Co.,** 5390 Bircher St., St. Louis, Mo., CA, **$403,640,** 75,000-kv ampere power transformer Glen H. Bell Sub-station, Spokane Co., WASHINGTON. Bonneville Power Admin., 827 N.E. Oregon St., Portland, Ore. L. C. Stewart, 827 N.E. Oregon St., Portland, Ore., engr. Awarded Feb. 2.

† **Selby Drilling Corp.,** 411 W. 5 St., Los Angeles, Calif., LB, **$294,602,** drilling and grouting foundation through embarkment, Folsom Reservoir Proj., near Folsom, ENG-04-167-54-46, CALIFORNIA. U. S. Eng., Wright Bldg., Sacramento, Calif. Bids Jan. 28. CD 1/7.



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CALIFORNIA—State Div. Hys., P. Wks. Bldg., Sacramento,

Granite Constr. Co., Box 900, Watsonville, Calif. LB, **$123,613**, plant mix on untreated rock surf., 0.8 mi. portions between 6.2 mi. E. of Watsonville in Santa Cruz Co. Bids Jan. 27. CD 1/18.

† **Bayshore Constr. Co.**, 744 Folger Ave., Berkeley, Calif., LB, **$115,260**, AFRTC WAREHOUSE and related utilities, ENG-04-203-54-28, HAMILTON AIR FORCE BASE, CALIF. U. S. Eng., 180 New Montgomery St., San Francisco, Calif. CD 1/7, under LB.

BUILDINGS

LOW BIDS AND CONTRACTS

Alfred Brown, 627 Dooley Bldg., Salt Lake City, Utah, CA **$495,619**, 2 story DIAL BLDG. at PROVO and 1 story DIAL BLDG. at OREM, UTAH. Mountain States Telephone & Telegraph Co., 132 W. Center St., Provo, Utah. Bids Jan. 29. CD 1/25.

Calistoga Joint Unified School Dist., Calistoga, Calif., rejected bids Jan. 6, elementary SCHOOL and Calistoga HIGH SCHOOL remodeling, addns., CALISTOGA, CALIF. LB, **$489,118**. CD 1/14.

▲ **McDonald Brothers**, 6060 West Adams Blvd., Los Angeles, Calif., LB, **$1,885,890**, South Reseda Junior High SCHOOL, LOS ANGELES, CALIF. Bd. Educ., 1425 S. San Pedro St., Los Angeles, Calif. Bids Feb. 4. CD 1/19.

Cahill Constr. Co., 350 Sansom St., San Francisco, Calif., CA, **$721,000**, general contract Silver Avenue Elementary SCHOOL, SAN FRANCISCO, CALIF. Dpt. P. Wks., City Hall, San Francisco, Calif. Bids Jan. 13. CD 1/20, under LB.

▲ **Fred W. Schell**, 41 Sutter St., San Francisco, Calif., CA, **$1,000,000**, STORE addns., alterations, SAN FRANCISCO, CALIF. Hale's Bros. Stores, Inc., W. J. Ahern, vice-pres., 867 Market St., San Francisco, Calif. Awarded Feb. 2.

CANADA

BIDS ASKED—HEAVY CONSTRUCTION

Ont., Kingston—PLAYING FIELD—B.A. 2/23—Defence Constr. Ltd., 40 Eglinton Ave. E., Toronto, soccer playing field at R. M. College, Job. 2726. $100,000. Plans deposit $100.

BIDS ASKED—BUILDINGS

Que., Lachine—SCHOOL—B.A. 3/2—School Comn., Lachine, 1 story, 48x320 ft. and 60x290 ft., concrete, steel, brick school, Sherbrooke St. Plans deposit $50. Meadowcroft & MacKay, 4115 W. Sherbrooke St. W., Montreal, Que., archts.

▲ **Ont., Hamilton**—HOME—B.A. 3/3—City, City Hall, part 1 and 3 story, 100,000 sq. ft. steel, brick, stone home for the aged, Sherman Ave. S. $1,000,000. C. C. Parker & Assocs. Ltd., 63 John St. S., engrs. Stanley Roscoe, c/o owner, city archt.

B. C., Vancouver—SCHOOLS, etc.—B.A. 3/11—Vancouver School Bd., 1595 W. 10 Ave., rein.-con. Brittannia High School addns., alterations, Parker St. at Cotton Drive. $900,000. Plans deposit $100. E. D. King, 1595 W. 10 Ave., archt. CD 1/15/47.

SOON LETS CONTRACT—BUILDINGS

Que., Montreal—APARTMENT—L. J. Heaps, 4105 Cote des Neiges Rd., soon lets contract apartment, Melrose Ave. near Chester Ave. $400,000. R. Fisher, 1499 Bleury St., archt.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ **Fluor Corporation of Canada Ltd.**, 200 Bloor St. E., Toronto, Ont., CA, **$3,000,000**, ammonia-making facilities expansion of present PLANT, SARNIA, ONT. Dow Chemical Co. of Canada Ltd., 204 Richmond St. W., Toronto, Ont. H. G. Acres & Co. Ltd., 2135 Culp St., Niagara Falls, Ont., engrs. CD 4/18/52.

▲ **J. L. E. Price & Co. Ltd.**, 4 Collier St., Toronto, Ont., LB, **$1,400,000**, 10 story, bsmnt., 120x140 ft., steel, brick, territorial HEADQUARTERS, James and Albert Sts., TORONTO, ONT. Salvation Army of Canada, 538 Jarvis St., Toronto, Ont. Bids Dec. 22. CD 12/1.

W. H. Cooper Constr. Co., Ltd., 21 Hunter St. E., Hamilton, Ont. CA. **$153,000**, 1 story, 150x230 ft. L shaped WAREHOUSE and SHOP with two story OFFICE section, TORONTO, ONT. Overland Express Ltd., 117 Union St., Toronto, Ont. Blake H. M. Tedman, 623 Sherbourne St., Toronto, archt. Awarded Feb. 9.

N. Bourassa Ltd., 3863 Rivard St., Montreal, Que., rejected bids Jan. 15, concrete, brick processing PLANT and WAREHOUSE, Cote de Liesse Rd., MONTREAL, QUE. **$350,000**. CD 1/5.

Gerard Dubois Constr. Co., 49 Glencoe Ave., Mount Royal, Que. Owner Builds. **$500,000**, HOUSING DEVELOPMENT, Marlborough Ave. near Gouin Blvd. W., MONTREAL, QUE. G. Jarry, 7271 Querbes Ave., Montreal, Que., archt.

W. G. Hunt Co. Ltd., 1045 Bishop St., Montreal, Que., CA, **$398,000**, 2 story 86x267 ft., concrete, brick. Sir Arthur Curne SCHOOL Rosedale St., MONTREAL, QUE. Protestant Bd. School Comn., 3460 McTavish St., Montreal, Que. Bids Feb. 2. CD 1/13.

ALASKA

BIDS ASKED—HEAVY CONSTRUCTION

† **Alaska, Ketchikan**—RECEIVER and POWERHOUSE BLDG.—B.A. 3/5—U. S. Eng., Anchorage, 77x20 ft. steel frame receiver and powerhouse bldg. for ACS facilities, Mountain Point, together with utilities and access road, ENG-95-507-54-45. Plans deposit $20.

(Proposal Advertisements see pp. 278 and 279)

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UNIT PRICES

Tight bidding on airport electrical system

Empire Electric Co. underbid the second bidder by only 0.3% to win a $251,872 contract for an apron electrical system and supplemental airfield drainage at Forbes Air Force Base, Topeka, Kansas. The U. S. Army Engineers, G. A. Vulliamy, project engineer, awarded the contract.

To be constructed are 4 electrical load centers with conventional substation pads; four load centers with conventional substations; and 62 flush-type electrical power receptacles.

Secondary electrical power and control cables will be installed in underground ducts to interconnect power receptacles with load centers. A primary electrical distribution system will connect the existing distribution system to the four load centers.

Also included is construction of drainage facilities; regarding of ground surfaces; and removal and replacement of concrete surfacing.

Skilled labor will receive $1.80 to $2.80 per hr; and common labor, $1.60 per hr. Bidders include:

1C	Empire Electric Co., Fort Worth, Texas	$251,762
2	Fred H. Spaulding, Oklahoma City, Oklahoma	252,533
7	Boyington Elec. Contr., Inc., Oklahoma City, Oklahoma	294,976
EE	U. S. Army Engineers, Kansas City, Missouri	279,990

Bids: 11 9-53 Item	Unit	Quantity	Unit Prices 1 C	 2
Conc encased ducts				
1-way, 4"	lf	54	$2.88	$2.29
4-way, 4"	lf	1,822	5.17	5.42
5-way, 4"	lf	332	6.64	7.04
8-way, 4"	lf	438	9.33	9.88
9-way 4"	lf	264	10.82	11.51
12-way, 4"	lf	69	17.58	15.24
16-way, 4"	lf	100	19.73	19.72
17-way, 4"	lf	58	24.40	21.37
Wire & cable, #8, insulated 600 v	lf	91,260	0.1153	0.136
#1, insulated, 600 v	lf	116,592	0.339	0.413
#1/0, insulated 600 v	lf	6,294	0.391	0.465
#2/0 insulated, 600 v	lf	14,004	0.4645	0.558
#4, bare	lf	3,730	0.0947	0.108
#2, bare	lf	50,800	0.1325	0.154
#2/0, bare	f	2,000	0.209	0.308
Pull box frames & covers	ea	14	122.31	108.00
Drainage pipe, 6"	lf	827	2.03	3.22
Poles, 35' high, class 4	ea	6	78.67	66.00
40' high, class 4	ea	3	88.00	72.00
45' high, class 4	ea	1	97.00	90.00
50' high, class 4	ea	1	107.00	114.00
Guying materials				
expansion anchors & rods	ea	12	21.40	18.35
guy shield	ea	12	7.34	5.25
3-bolt clamps	ea	58	3.41	2.00
strain insulators	ea	14	1.62	1.00
guy dead ends	ea	2	4.15	3.35
guy loops & saddles	ea	14	3.20	3.35
guy strand	lf	650	0.25	0.23
Pole line materials				
crossarms, bolts & braces	ea	26	13.70	19.25
suspension insul, clamps	ea	48	6.44	5.90
D.A. bolts with eyenuts	ea	32	3.75	2.45
pin insulators	ea	42	2.25	0.80
steel pins	ea	42	1.85	0.75
lighting arresters	ea	12	13.90	15.50
ground rods	ea	8	7.85	8.00
moulding, 81', ground	ea	4	0.29	3.00
secondary racks, 4-spool	ea	2	8.60	7.10
Structural concrete	cy	8.5	215.00	135.00
Modify existing MH	ls	1	145.00	230.00
Outlet receptacles	ea	62	226.00	207.00
Load center, conven substn	ea	4	19,819	17,140
Disassembly of materials, remove poles, salvage	ls	1	404.00	190.00
Clearing of site	ls	1	1,693	1,000
Remove conc pavement				
building entrance	sy	4,728	0.677	1.00
sidewalks	sy	78	0.85	1.00
Concrete pavement, 9"	sy	2,804	5.65	6.75
Conc pavement, 6"	sy	1,650	6.77	5.00
4", sidewalks	sy	197	7.90	3.60
Inlet frames to grates	ea	8	69.20	60.00
Junction box frame & cover	ea	1	124.20	40.00
18" drainage pipe	lf	1,091	7.90	6.10
24"	lf	568	10.16	8.05
Unclassified excavation	cy	3,200	1,236	1.50
Regrade water valve boxes	ea	21	56.45	10.00
4" base crse for conc pvt	sy	2,804	0.452	1.05
Struct conc for drn struct	cy	28.5	124.78	110.00
Seeding	ac	5	253.95	400.00
Filling core holes	ea	24	4.52	5.00

Two items swing bridge bid

Alexander Jarvis Co. was able to underbid by 10% his nearest competitor for the Wilbur Cross highway underpass mainly because of his low bids on borrow and structural steel. Jarvis bid 30% below his rival on the borrow, and 15% below on structural steel.

The bridge will be a two-span, continuous, welded-girder type with skew span, 203.8 ft high. Bituminous macadam pavement on bridge and approaches will be 22-ft wide, 8-in. deep, and 987-ft long.

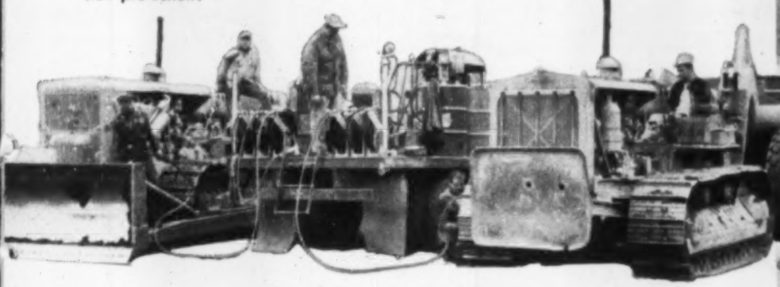
Minimum wage rates include: skilled labor, $2.05 per hr; semi-skilled labor, $1.65 per hr; and unskilled labor, $1.75 per hr. Bidders include:

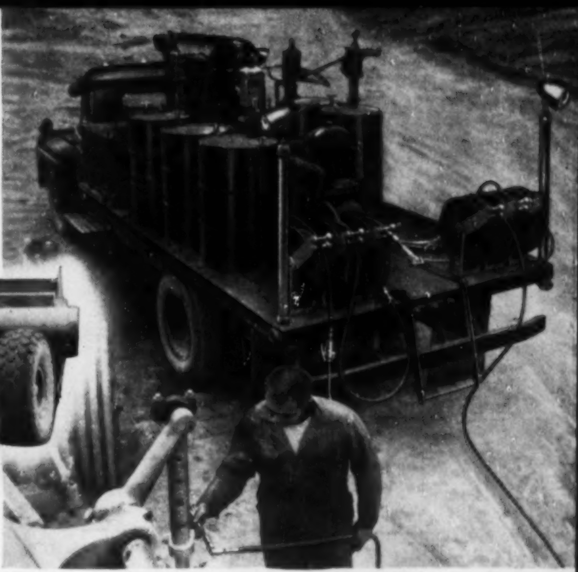
1C	Alexander Jarvis Co., Brookside, Connecticut	$247,693
2	Cooke-Ross, Inc., Torrington, Connecticut	275,816
3	Brookside Const. Co., East Hartford, Conn	278,872

Bids: 1-11-54 Item	Unit	Quantity	Unit Prices 1 C	 2
Clearing & grubbing	ls	1	$1,200	$4,500
Earth excavation	cy	9,116	0.60	0.50
Bridge excavation	cy	370	4.00	11.00
Trench exc, 0'-6' deep	cy	520	1.25	1.50
Rock intrench exc, 0'-6' deep	cy	4	5.00	20.00
Ditch excavation	cy	102	2.00	1.50
Borrow	cy	94,230	0.40	0.57
Reinf conc pipe, 15"	lf	572	2.50	2.50
Asph coat 6M pipe, 15"	lf	240	3.25	3.50
24"	lf	124	6.00	6.00
Type "C" catch basin	ea	11	200.00	200.00
Manhole	ea	1	225.00	200.00
Stl test piles, 28'	ea	2	500.00	250.00
48'	ea	2	900.00	300.00
Furnish steel piles	lb	71,000	0.065	0.06
Drive steel piles	lf	1,660	1.25	1.00
Portland cement	bbl	1,934	4.50	5.50
Natural cement	bbl	207	4.50	5.00
Class "A" concrete	cy	832	35.00	37.00
½" premolded bit joint filler for bridges	sf	75	0.75	0.60
Deformed steel bars	lb	117,000	0.085	0.10
Structural steel	lb	425,000	0.16	0.189
Damp proofing	sy	385	0.75	0.75
Metal bridge rail	lf	415	8.00	7.00
Gravel fill	cy	225	2.00	2.50
Pervious material	cy	855	1.50	0.85
Subbase	cy	4,295	2.00	0.85
Formation of subgrade	sy	16,113	0.10	0.15
Broken stone for base	t	2,700	4.90	4.15
Rolled gravel base	cy	1,048	2.00	1.50
Transverse expansion jnt	lf	174	1.50	2.00
Mat reinf for conc pvmnt	sy	2,031	0.60	0.75
Conc for pavement	cy	452	15.00	15.00
Hot asphalt concrete	t	270	11.00	12.00
Broken stone for bit mac pvt	t	1,803	5.00	4.35
Rolled bank gravel surface	cy	271	2.00	1.75
Bit mat for surf trmnt	gal	1,220	0.143	0.20
for bit macadam pvmnt	gal	33,415	0.143	0.17
Sand cover for bit surface treatment	sy	2,440	0.10	0.10
Shaping & cleaning slopes	lf	3,647	0.70	0.80
Granite slope curbing	lf	516	5.00	2.60
Curved gran slope curving	lf	41	6.50	3.50
Paved ditch	sy	98	4.00	4.00
Wire rope railing	lf	3,100	1.10	1.05
Type "B" anchorage	ea	4	35.00	35.00
Type "C" anchorage	ea	19	23.00	25.00
Compensating anchorage	ea	38	28.00	30.00
Single post	ea	18	6.00	6.50
Reset wire rope railing	lf	1,210	0.70	0.50
Reset single post	ea	5	4.50	3.00
Riprap	t	15	5.00	10.00
Concrete marker post	ea	2	15.00	15.00
Crushed stn for slope prot	t	150	4.00	4.00

Six reels mounted on back of truck, plus one water hose on each side allow the Portable Service Station to service two pieces of equipment at once. Here a giant bulldozer and heavy "Cat" get in-the-field service — no lost time — complete lubrication protection!

Alemite units mount directly on flat truck bed. Lubricant is pumped direct from refinery drum, is delivered to bearings completely free of dust, grit or contamination. 40′ high-pressure hoses reach out to serve many fittings on each stop.





here's how Alemite Portable Service Stations help

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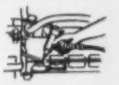
The largest road-building project ever undertaken by man! That's the 427 mile, four lane, New York State Thruway. 80,000,000 cubic yards of earth to move — 1,125,000 square yards of concrete to pour — countless underpasses — bridges, including two new ones across the Hudson. Cost, about a *billion* dollars! And the vast bulk of this mammoth undertaking will be completed within a year and a half, an amazing new record for this type of construction!

To meet this record-breaking pace on their part of this giant project, Arcole Midwest Corporation of Skokie, Ill., assembled 60 odd pieces of heavy earthmoving and grading equipment on their stretch of road outside Schenectady. And to keep that equipment in the top condition it has to maintain, they chose Alemite Portable Service Stations.

Heavy-duty pumps, hose reels, etc., are custom-mounted on a 2½ ton flat bed truck. Equipment is serviced right in the field for this *triple saving* . . . **1. Save Time!** By bringing complete power lubrication to all equipment right on the job — safely, efficiently! **2. Save Money!** By cutting expensive lubrication downtime — increasing output of both men and machines. **3. Save Equipment!** By greatly reducing the possibility of costly, time-consuming, bearing failure.

Alemite portable service stations
Offer these 4 Services

Fast, easy lubrication of track rolls and fittings.



No oil wasted — use exact amount of lube required.

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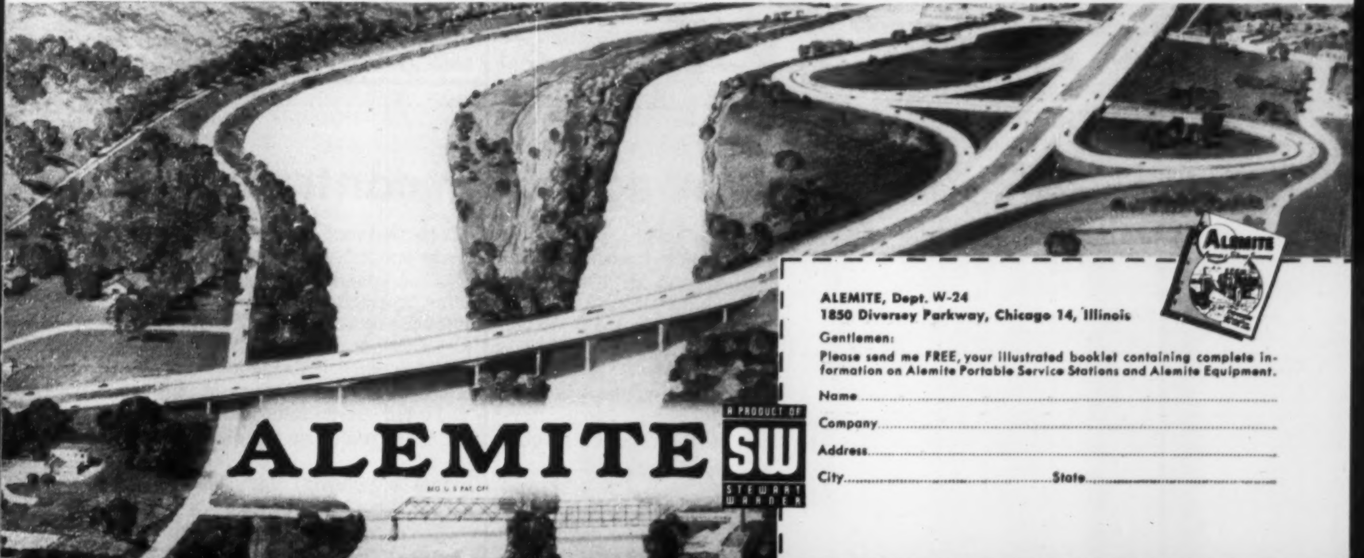

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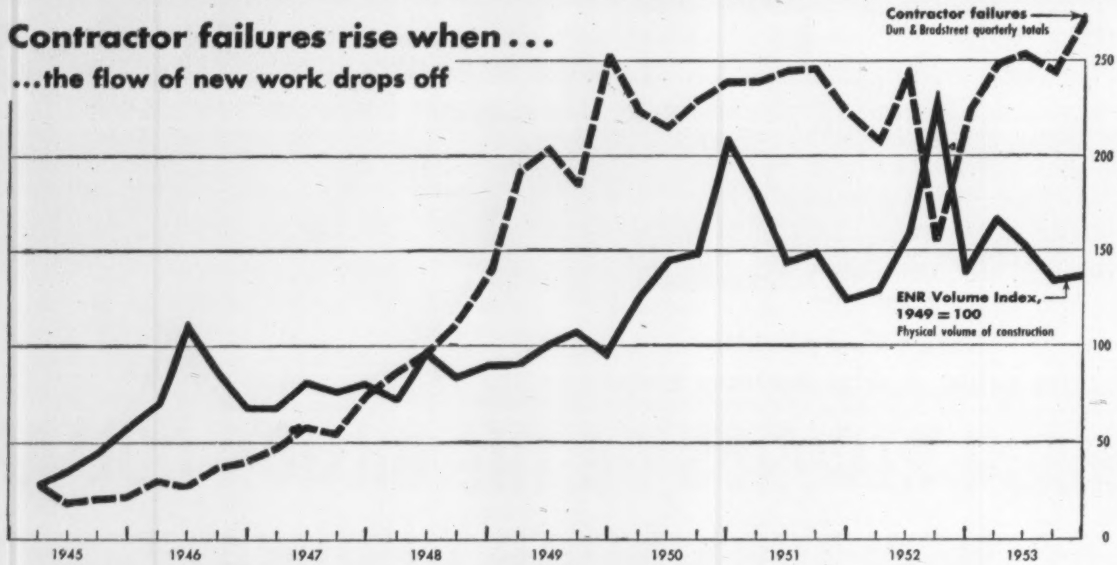
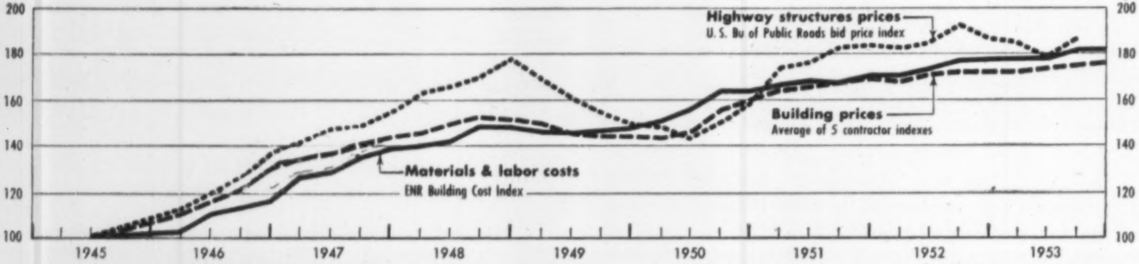
Contractor failures rise when . . .

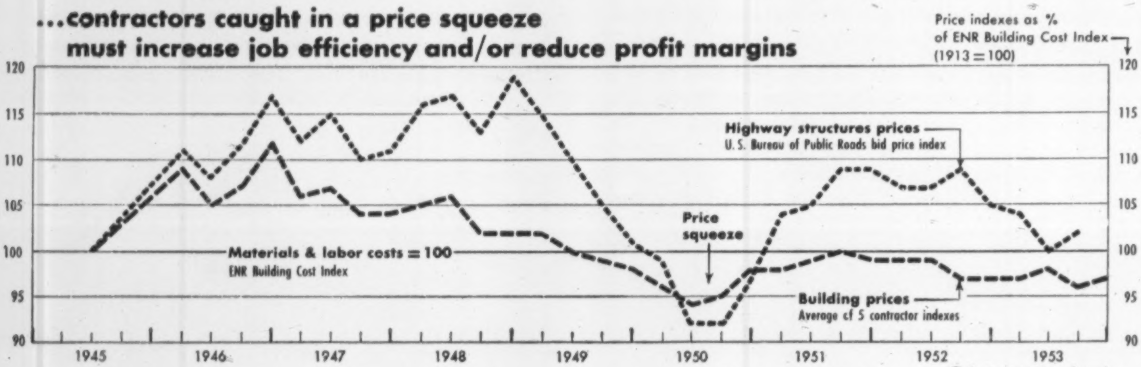
. . . the flow of new work drops off



. . . competition holds prices down while costs are rising



. . . contractors caught in a price squeeze must increase job efficiency and/or reduce profit margins



© Engineering News-Record

The price squeeze is on again for contractors

Though 1953 was a good year for construction, it was also a year of adjustment for the industry. Harder competition began to separate the men from the boys. As a result, contractor failures rose to the highest point since World War II (chart).

Months ago (Aug. 20, 1953, p. 21), an ENR survey made plain that there are more heavy construction contractors today than in earlier years, and that the average contractor can handle 50% more work than in 1949. Although dollar volume of new awards remains very high, physical volume of new contracts in 1953 dropped 10% below 1952's record level. You can see this from ENR's volume in the top section of the chart. No matter how you figure it, the volume of work available has not kept pace with the gain in contractor capacity.

Because of this increasing competition, contractors have been figuring bid prices more closely. At the same time, construction costs have continued to rise slightly (see middle section of chart). The Bureau of Public Roads bid price index for highway

(*Continued on page 274*)

THE LONGER LOOK:

The inconsistencies of Colin Clark, who thinks high construction costs may soon help to cause a U. S. recession

Are construction costs too high? Colin Clark, a British economist who has kicked up a stir in American business circles by announcing signs of an impending depression, thinks they are. He sees such costs as a cause for an early economic decline. At the same time, he regards a huge latent demand for housing—once costs are brought down—as a hopeful indication of early recovery.

High construction costs are only one of the "danger signs" Clark has been emphasizing. Others include, as he interprets them:

(1) A tight money supply relative to the labor force and wage rates.

(2) A slackening in the high rate of investment by business.

(3) Excessive inventories, as compared with sales.

Most dangerous, in Clark's view, is the prospect of a "chain reaction" once there is a significant drop in certain sectors of the economy—for instance, in inventories. "Once everybody is engaged on cutting back inventory because sales have fallen," says Clark, "because somebody else has cut back inventory because his sales have fallen . . . we are involved in a process which goes on and on of its own accord."

• **Clark argues**—The British economist agrees: "Demand is choked off by the present very high construction costs which have risen relative to the price of all other goods by no less than 60% in the last twenty years."

Clark's claim that construction costs have risen 60% more than other prices since 1935 seems to be based on faulty mathematics. The chart (below) shows changes in the composite Construction Cost Index of the Department of Commerce and the Wholesale Commodity Price Index of the Department of Labor from 1935 through 1953. If the 1935 average is taken as 100, the construction cost index for December, 1953, was 266.2; the wholesale price index for the same month, on the 1935 base, was 211.7. Construction costs thus rose by almost 60 index points more than wholesale prices, but the actual percentage difference between the increases is less than 50%. (The ENR Building Cost and Construction Cost Indexes give about the same result when compared with wholesale prices.)

How have increasing construction costs affected the volume of construction? So far, they certainly have not "choked off" demand. Since 1935 the annual dollar volume of new construction put in place has risen more than seven times, compared with the increase of 1¾ times in construction costs. The chart indicates that, except for the war years, the dollar volume of new construction almost every year has grown at a faster rate than construction costs, even since 1950.

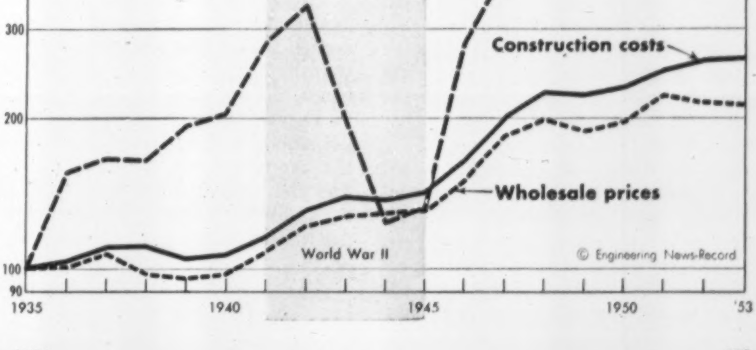
• **Demand boosts costs**—On the other hand, there is no denying that construction costs—as a measure of prices of materials and labor—have risen relative to prices generally in recent years. But it should be obvious that one factor in the rise in construction costs has been the mounting demand for construction.

Furthermore, construction cost indexes tend to overstate the actual cost increases. Most of these indexes are based primarily on wage rates and prices of materials and do not reflect increases in productivity or improvements in construction methods. Also, they do not reflect the great economies in use of materials and of floor space. If these advances are taken into consideration, the apparent increase in construction costs is reduced.

• **Housing need**—A huge latent demand for housing, it may be noted, is Clark's chief reason for believing that the slump he expects will not last long. He argues, however, that this demand will not be made known until costs are brought down. How such a reduction in costs can be effected, Clark does not indicate. Certainly it would take a severe drop in construction activity to force substantial cuts in wage rates or material prices. This would seem to imply going through a serious depression in order to achieve the means of pulling out of it.

There is a distinct possibility that if construction costs turned down there would be an immediate decline, rather than an increase, in demand for construction. Most construction demand is deferrable, and a belief that the cost trend had changed would be a strong invitation to postponement of building plans. This decrease in demand itself would help stimulate the further price reductions that were expected. That could set off a chain reaction of a type Clark has not anticipated.

Continued savings through improved methods and greater efficiency in building use are less dramatic, but in the long run they probably will do more for the health of the construction industry and of the economy.



Building cost and price roundup

Indexes, 1913=100

Weighted cost indexes	Orig. base	1953 Mar.	Jun.	Sept.	Dec.	1954 Jan.	Feb.
ENR Construction	1913=100	588	594	611	611	**614**	**615**
ENR Building	1913=100	425	426	436	436	**437**	**438**
Assoc. Gen. Contractors	1913=100	399	411	416	418	**422**	...
Marshall & Stevens	1926=100	443	447	450	**452**	...	...
American Appraisal*	1913=100	569	573	583	**585**	...	...
Weighted price indexes (adjusted for estimated productivity and profit margins.)							
Boeckh, U. S. average	1926-29=100	438	446	451	**451**	...	...
Smith, Hinchman & Grylls	1926=100	511	511	500	496	**496**	...
Contractor price indexes							
Aberthaw	1914=100	383	385	392	**392**	...	...
Austin	1926=100	344	347	350	**350**	...	...
Fruin-Colnon	1926=100	456	460	462	465	**463**	...
Fuller	1913=100	422†	434‡	437#	...	**445**	...
Turner	1913=100	495†	500‡	500#	...	**496**	...

*Corrects for estimated productivity †April ‡July #October

(Continued from page 272) structures dropped in the last quarter of 1952 from its peak in the third quarter and declined again in the second quarter of 1953. Though it climbed again in the third quarter, indications are that the fourth quarter probably will show another dip.

Building prices (as indicated by an average of the five contractor indexes—Aberthaw, Austin, Fruin-Colnon, Fuller, and Turner) did rise slightly. But they rose more slowly than ENR's Building Cost Index.

Where the squeeze really shows up is when you consider the BPR highway structures price index and the average of five contractor indexes as a ratio of ENR's Building Cost Index. This is not a measure of profit margin. But it does give some idea of the changing relationship between construction costs and the prices which contractors are charging for construction work.

For instance, it shows the squeeze that took place in 1950, caused partly by a sharp climb in costs after the Korean war started. This time the squeeze has been more gradual, but it has put more contractors into trouble, probably because there are more new ones and because they have more organization to keep at work.

The table (above) gives details on how construction costs and prices have moved closer together since the start of 1953.

• **Costs**—ENR's Construction Cost and Building Cost Indexes are continuing to move slightly. The cost index on materials and labor costs kept by Associated General Contractors rose nearly 6% between the first quarter of 1953 and this January. The Marshall & Stevens index rose more than 2% during 1953. The American Appraisal index, which covers four types of buildings, continued to rise slightly in the fourth quarter and was up a little less than 3% for the year.

• **Prices**—The two weighted price indexes show varying trends. The Boeckh index for five types of commercial and factory buildings leveled off in the last half of the year after rising about 5%. The Smith, Hinchman & Grylls index for December was down about 3% since the start of the year, then leveled off in January.

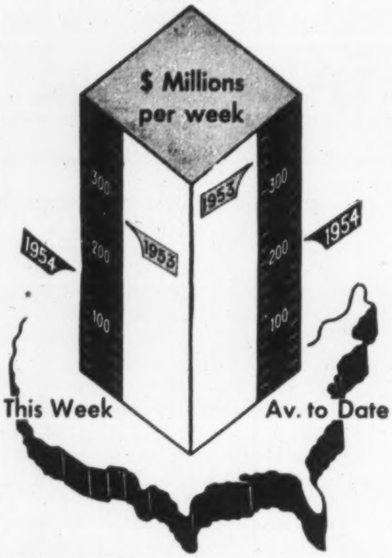
The five contractor price indexes measure trends in actual prices charged by the contractors for finished buildings. Of these indexes, two leveled off in the last half of 1953, one declined in January after having been stable for the previous six months, one declined slightly in January after having risen slowly all through 1953, and only one showed a continuous increase since the start of 1953.

The average result of all this was a slight 1953 gain in prices charged by contractors. But the gain in prices has been slower than the rise in costs.

Two other price indexes, both in the heavy construction field, declined during 1953. The semi-annual index kept by the San Francisco District, Corps of Engineers, for the U. S. west of Denver dropped from 155.04 in the second half of 1952 to 140.50 in the second half of 1953—almost 10%. And the highway price index kept by the California Highway Division went down from 226.2 in the last quarter of 1952 to 216.7 in the last quarter of 1953. That is a drop of a little less than 4%.

Activity This Week

(In millions of dollars)
As reported to ENR



Amount of contracts let

	Week of Feb. 18*	Cumulative 7 wks 1954	1953	% chge
Federal	$4.8	$117.8	$281.5	—58
State and municipal	48.5	494.5	631.1	—22
Total pub.	53.3	612.4	912.6	—33
Total priv.	96.3	694.7	1,530.2	—55
U. S. total	**$149.6***	**$1,307.1**	**$2,442.8**	**—46**

Contracts by type of work

	Week of Feb. 18*	1954	1953	% chge
Waterworks	$2.4	$25.5	$26.5	—4
Sewerage	2.0	29.1	60.7	—52
Bridges	3.0	42.9	68.1	—37
Highways	11.5	156.6	170.4	—8
Earthwork, waterways	1.8	34.9	59.8	—42
Buildings:				
Public, excl. hsg.	19.0	194.0	250.8	—23
Housg. pub.	0.9	29.1	128.6	—77
Housg. priv.	46.6	344.6	640.2	—46
Commercial	24.3	138.7	135.2	+2
Industrial	23.9	186.7	672.8	—72
Unclassified	14.2	125.0	229.4	—46
Total	**$149.6**	**$1,307.1**	**$2,442.8**	**—46**

*4-day week.

NOTE: Minimum size projects included are: Waterworks and waterways, $34,000; other public works, $60,000; industrial buildings, $82,000; other buildings, $300,000.

New capital for construction

(millions of dollars)	Week of Feb. 11 1954	Cumulative 6 Wks 1954	% chge 1953-54
Corporate securities	$75.9	$395.5	—3
State and municipal:			
Excluding housing	60.5	294.5	—9
Housing	....	10.6	—89
Federal loans	1.4	16.5	—6
Federal aid	....	....	....
Total non-federal	**$137.8**	**$717.1**	**—15**
Federal approp.:			
In U. S.	....	....	....
Outside U. S.	....	....	....
Total new capital	**$137.8**	**$717.1**	**—15**

ENR indexes

		Base years = 100 1913	1926	1949
Constr.	**Feb. '54**	**614.71**	**295.49**	**128.86**
cost	Jan. '54	614.04	295.17	128.72
Bldg.	**Feb '54**	**437.55**	**236.53**	**124.38**
cost	Jan '54	436.88	236.16	124.19
Volume	**Jan '53**	**338**	**137**	**98**
	Dec '53	547	222	158

More "right to work" laws readied

Five state legislatures get proposals to ban compulsory unionism—Other labor legislation pending

Five states are being urged to join others in the U. S. in enacting laws banning the closed shop and other forms of compulsory unionism, a check of state legislatures showed this week. Fourteen other states already have such laws.

Lawmakers in Kentucky, Mississippi, New Jersey and South Carolina (where the strong backing of Gov. James Byrnes was counted on to put the law through) already have begun consideration of such laws. And in Kansas, a legislative group has announced that a similar measure is being prepared for submission to the 1955 legislative session.

Labor leaders and industry are watching the progress of these laws closely, looking on success or failure as an indicator of what may happen next year, when almost all state legislatures meet. Many observers also see in the state actions a reflection of how Congress may be expected to react to suggested changes in the Taft-Hartley Law.

• **Other laws are asked**—Labor legislation generally was holding the attention of the states, the survey indicated.

In Michigan and in New Jersey, governors called for enactment of new state labor relations laws. Both governors saw a danger of chaos in labor-management relations because of the withdrawal of the National Labor Relations Board from many such disputes, and called for machinery to fill the gap. Michigan's Governor Williams asked for the establishment of a state labor relations board to handle disputes not settled by NLRB.

In Massachusetts, Governor Herter has called for a revision of a law that empowers him, in the event of strikes, to seize industries essential to public health and safety. Herter wants a provision permitting him to appoint a moderator to attempt adjustment during a 15-day conciliation period, rather than to be limited to trying to arbitrate the matter after seizure.

And in Kentucky, the lower house of the legislature passed an amendment to the state's Motor Carrier Act that would permit drivers of common carrier and contract trucks to refuse to pass picket lines during a bona fide strike. Previously such trucks had to cross—and union leaders charged that the law had been used to break strikes.

• **Courts act too**—The courts were having their say on the labor legislation issue, too.

An Oregon circuit court, in a test case, ruled that a section of state law concerning picketing is unconstitutional. That section provided that a legal picket must have been certified as, or is recognized as, the bargaining representative of the employees involved.

And in Tennessee, the Nashville Trades and Labor Council said it would put up a strong fight to stop any move to repeal the state's prevailing wage law. Passed by the 1953 legislature, the law requires, after surveys by the state department of labor, the establishment of prevailing wages for workmen on buildings or construction paid for with any state funds.

TVA sets wage

Pattern set by Authority seen as the cause of new complaint by contractors

Wage increases that range from 2½ to 17½ cents an hour—and up to $300 a year—for 14,000 AFL building trades workers in the seven states in which the authority operates have been approved by directors of the Tennessee Valley Authority.

And, although TVA's general Manager John Oliver said that the wage boosts "reflect increases negotiated between private contractors and unions" over the past 12 months, the action brought an immediate protest from contractors. The local chapter of the Associated General Contractors has long spearheaded protests against TVA's methods of negotiation—claiming that wages set by the big organization almost automatically become the standard for the area, despite the fact that private builders do not sit on the negotiating groups.

Bolstering this complaint, C. O. Street of Charlotte, S. C., president of AGC, commented that the wage increase would mean a rise of about 2% in private construction costs in the area—which would include the entire Tennessee Valley. Whether the group will sponsor another attack on TVA's methods is still undecided—but contractors are inclined to believe that their recourse must be through Congressional action.

• **The increases**—Wage rates set by TVA include (old rates in parentheses):

Laborers $1.37½ ($1.30); bricklayers $3.10 ($3.00), carpenters $2.47½ ($2.37½); electricians $2.87½ ($2.77½); ironworkers $2.77½ ($2.65); lathers $2.65 ($2.55); operating engineers $2.72½ ($2.60).

Unions seek to force overtime on U. S. job

Two Arkansas labor unions have taken action—by picketing the job—that may force re-examination of a 1912 U. S. law that permits a 56-hr, 7-day week with overtime pay at military projects. Scene of their protest is construction of the Little Rock Air Force Base near Jacksonville, Ark.

Last November work started on the base, a $50-million project slated as a permanent installation of the Strategic Air Command for jet bombers.

D. B. Hill of Little Rock and S. E. Evans of Ft. Smith jointly hold two Corps of Engineers contracts (worth about $1.2 million) for initial grading and clearing operations. They're obligated to pay overtime after eight hours in a single day—but not if the extra time is chalked up by working more than five days.

By the middle of December Local AFL operating engineers—along with AFL hod carriers, building and common laborers—were picketing the construction site. Their complaint: Hill and Evans were not paying overtime after 40 hr.

Other labor unions joined the protest, occasionally participating in mass picketing demonstrations.

Then Sen. John L. McClellan took up the case. Concluding that it probably would take too long to get relief through legislation, he began to explore another possibility—an executive order to remove the Little Rock Air Force Base from provisions of the 1912 law.

Meanwhile, contractors Hill and Evans claim that work is proceeding without interruption, and late this month bids for paving the 10,100-ft runway are to be turned in to the Army Engineers. This contract—allowing 435 days for completion—is expected to be $5 or $6 million.

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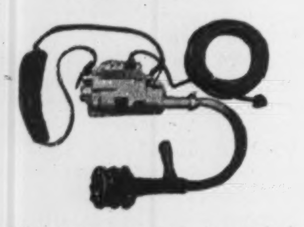

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Plumbing group found guilty of suppressing competition

A plumbing contractors association, several firms and a union official in Las Vegas, Nev. have been found guilty of violating the Sherman Act on charges of restraining interstate trade by controlling sale, distribution and installation of plumbing supplies.

Affirming a previous indictment by the U. S. District Court for Nevada, the Ninth U. S. Circuit Court of Appeals in San Francisco fined the defendants (11 in all) and sentenced three of them to six-month terms.

Practically all plumbing and heating supplies used in southern Nevada are manufactured in other states, and sold and shipped by interstate commerce into Nevada. The court found that the plumbing contractors then distributed and resold them, making a charge and obtaining a profit from both selling and installing.

Evidence was introduced to show that the defendants conspired to suppress competition by fixing prices and dividing the available market through their association. An estimator, common to all the contractors, was hired to figure a plumbing job and prices. Then if two or more member contractors in the group were to bid on the job, an allocation committee would designate who should submit the lowest bid. Token bids at higher prices were also submitted.

If an outside contractor got the job, the government charged, the business representative of the Las Vegas plumbers union would enforce compliance with the fixed prices by keeping journeymen and apprentice plumbers off the job. Wholesalers would be boycotted if they sold or offered to sell supplies at prices and terms not agreeable to the association.

Labor briefs . . .

- **Suggests pay cut**—Voicing fear of pricing homes out of the market, P. A. Reardon, secretary of the Louisville, Ky., Building & Construction Trades Council called for lowered pay scales for home construction. Said Reardon: Only one craft now has lower rates for homebuilding than for heavy construction—more should follow.

- **Union rift?**—In what many observers thought was public acknowledgement of a widening rift in labor ranks, about 400 Youngstown district bricklayers pulled out of the AFL United Labor Congress. The fight concerns political factions within the congress—in particular an unsuccessful attempt by building trades unions to unseat the present head of the congress—a member of the teamsters union.

- **26,000 men at Portsmouth**—Sometime late this year, construction employment at the Atomic Energy Commission's huge Portsmouth, Ohio, plant will hit a peak of about 26,000 men, according to AEC.

- **Ask no raise**—Local 90-A, Technical engineers, AFL, has signed an agreement with Chicago contractors not to ask for pay increases in the coming year. The union represents civil engineers and surveying teams employed on construction projects.

- **No union**—Professional and subprofessional engineering employees of DuPont at the huge Savannah River atomic energy project want no union representation, according to their vote in a recent election. Final count was 59% against any union, while 41% voted for representation by the American Federation of Technical Engineers.

- **Supreme Court hearing**—The U.S. Supreme Court has granted a hearing to the United Mine Workers and two of its affiliates (United Construction Workers; District 50, UMW) in a case in which they were ordered to pay $129,000 damages to a construction company. The company had charged the unions with interfering with its workmen on a construction job.

- **Compensation talk**—More than 200 delegates concluded meetings in San Francisco to discuss and review California workmen's compensation laws. The AFL sponsored the session.

- **Bargaining figure**—Building unions in the Cleveland area have kicked off their 1954 wage drive with demand for a boost of 32.5 cents an hour. Last year demands were the same, but settlement was at 12.5 cents an hour. Three trades—boilermakers, operating engineers and asbestos workers—have not backed the wage requests.

- **Floor pushed up**—Increases in minimum wage schedules for building and highway construction workers in New Mexico have been set by the State Labor and Industrial Commission. Boosts are about 10% for skilled labor and 11 to 12% for unskilled workers. The pay floors will be applied to all public highway and building contracts of New Mexico, its counties and cities.

Find electricians guilty of antitrust violation

Despite flat denials of the charges, a federal court jury at Nashville, Tenn., held a local of the electrical workers' union was guilty of violating antitrust laws through its attempts to control award of contracts for electrical work.

The jury found that Local 175, International Brotherhood of Electrical Workers, and its business agent, Earl W. Burnette, had conspired with the Chattanooga chapter of the National Electrical Contractors Association to control award of contracts. According to evidence presented by the U. S. government during the trial, the control was exercised by the union in refusing to supply men to non-association contractors to enforce a selective bidding system.

Burnette flatly denied the charge, as did other witnesses who testified that men had been supplied to "outside" contractors and that "outsiders" even had been invited to import skilled help when the local union rosters could not fill their demands.

However, government witnesses had testified that the local NECA chapter in fact decided who was to get jobs in Chattanooga. One government witness claimed he had submitted between 300 and 500 bids—and had never received a job award; and that when he resigned from the association he was forced out of business because he was not able to obtain workmen.

NLRB claims records in clearing agenda

Winding up its year's activities somewhat belatedly, the National Labor Relations Board last week had totaled up its figures, and claimed a series of records for itself.

Said NLRB:

The board and its general counsel reduced the average time of processing collective bargaining election cases from the previous low of 90 days to 60 days;

The board reduced the average time required for the processing of unfair labor practice cases from 447 days to 350 days;

The board issued an all-time record number of decisions—3,053; an all-time record—526—of decisions in unfair labor practice cases; closed an all-time record number of cases (through the general counsel) without necessity of formal practice—5,103; issued formal complaints charging violations in a record 950 cases.

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The Prehy Grouter, Type S, is a dependable, compact pressure machine specifically designed and experience tested to provide construction men with a safe and economical piece of equipment for placing grout mixtures and other materials by pneumatic pressure. In addition to fluid, plastic, dry-pack, and inert grouting, the Prehy Grouter also performs many other types of concrete construction work that were either impossible or too costly by other methods.

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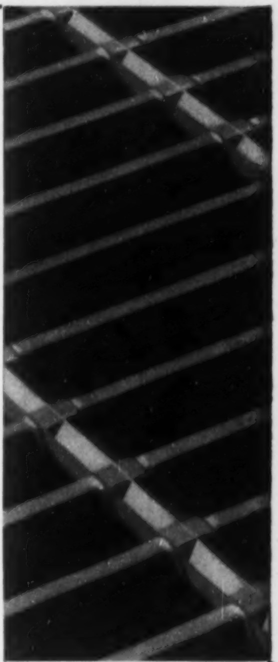

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This particular design of welded grating is made with the main bars on 1-3/16" centers or .915 centers and the cross bars on 4" centers in panels 24" or 36" wide, and lengths to 40'-0".

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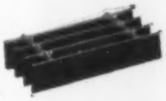

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OFFICIAL PROPOSALS

RATE: The rate for Official Proposal advertising is $1.50 per line or fraction set solid. Where the advertisement is set other than solid, the space is measured by total space occupied and charged on basis of 12 lines to the inch.

CLOSING DATE: Friday 10:30 A.M. for issue dated the following Thursday.

SEND COPY TO: Official Proposal Division,
Engineering News-Record
330 West 42nd Street
New York 36, N. Y.

Bids: February 25, 1954

New York State Road Work

NOTICE TO CONTRACTORS: STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.,— Pursuant to the provisions of the Highway Law, Canal Law, and special provisions for projects financed with Federal Aid funds, sealed proposals will be received until ten-thirty o'clock A.M., eastern standard time on the 25th day of February 1954, by Henry A. Cohen, Director, Bureau of Contracts and Accounts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for the following projects:

County	Contract No.	Name	Miles	Type	Deposit	Estimated Cost of Work
		DISTRICT No. 1 G. L. NICKERSON, District Engineer 353 Broadway, Albany, N. Y.				
Saratoga	FARC 54-30	Gansevoort-South Glens Falls S.H. 1460, Project S-402(1)	0.71	Asp. Conc. Opt.=0.67 Mi. Misc: Work=0.04 Mi;	$13,000 Plans $10	$235,000
		DISTRICT No. 2 L. KETCHUM, District Engineer, 109 No. Genesee Street, Utica, N. Y.				
Oneida	FASS 54-3	Oriskany Falls-Lairdsville, Pt. 3 (Co. Rd.) Proj. S-229(3)	1.14	Bit. Mac. Opt. (Rd. Mix)	$3,500 Plans $10	64,000
		DISTRICT No. 4 E. G. YOUNGMANN, District Engineer, Barge Canal Terminal, Rochester, N. Y.				
Monroe	FASS 54-4	Dewey Avenue (Co. Rd.) Project S-433(1)	1.76	Asp. Conc. Opt.=1.57 Mi. Misc: Work=0.19 Mi:	$18,000 Plans $15	327,000
Monroe	M-54-1	Concrete Apron at Gates 1 and 2 Barge Canal	0.14	New Concrete Apron, Protection for Conc. & Venturi Outlets	4,100 Plans $10	72,905
		DISTRICT No 6 J. H. THOMAS, District Engineer, State Office Bldg., Hornell, N. Y.				
Chemung	FAC 54-2	Elmira City: Madison Ave., Lake St. Proj. U-479(8) Cont. 2	0.66	Traffic Signal System	$2,000 Plans $10	36,000
		DISTRICT No. 7 R. W. SWEET, District Engineer, 444 Van Duzee St., Watertown, N. Y.				
Franklin	FARC 54-32	St. Regis Indian Reservation-Fort Covington, S.H. 1659 Proj. F-580(8)	0.22	Asp. Conc. Opt. R.C. Closed Box 36'	$5,000 *Plans $10	97,000
		DISTRICT No. 8 J. S. BISBY, District Engineer, Pleasant Valley Road, Poughkeepsie, N. Y.				
Dutchess	FASS 54-1	Sharon Turnpike, Co. Rd. 106 Project S-379(1)	3.08	Asp. Conc. Opt. R. C. Twin Box Br: 34'	$20,000 *Plans $15	373,000
		DISTRICT No. 9 F. W. DONOVAN, District Engineer, 71 Frederick St., Binghamton, N. Y				
Schoharie	FARC 54-33	Schoharie Middleburg, S.H. 5444. Gallupville-Vrooman, S.H. 5086 Proj. F-553(4)	0.88	Asp. Conc. Opt=0.80 Mi. Misc: Work=0.08 Mi; Comp. I-Beam Br. 222'	$26,000 Plans $15	495,000
		DISTRICT No. 10 M. E. GOUL, District Engineer, Montauk Highway, Babylon, L. I., New York				
Nassau	FARC 54-31	Conduit Boulevard Pt. 3, S.H. 1699A Proj. U-947(10)	2.16	9" Cem. Conc. Pavt. (Var. Widen.) & Asp. Conc: Opt. (Widen and Resurf.)	$123,000 Plans $15	2,060,000

Maps, plans, specifications and proposal forms may be seen and obtained at the office of the State Department of Public Works, Bureau of Contracts and Accounts, Albany, N. Y., and at the office of the District Engineers noted above, and may also be seen at the office of the State Department of Public Works, 270 Broadway, New York City.

The deposit for Plans and Proposal Forms for each contract is indicated above. A refund will be made in full to bidders for return of one set, in good condition, within 30 days of award, or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.

Special attention of bidders is called to "General Information for Bidders" in the proposal, specification, and contract agreement, and to the special provisions applying to projects financed with federal funds. Award of a contract is subject to priorities and allocations under the Defense Production Act of 1950, as amended, and all regulations issued thereunder.

Proposal for each contract must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum as specified in the advertisement and the proposal. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Highway Law, as set forth in "Instructions to Bidders."

When optional types are permitted on contracts with federal funds, bidders must state in the space provided in the proposal the exact designation of the optional type upon which the proposal is predicated.

The right is reserved to reject any or all bids.

B. D. TALLAMY
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Contractors—

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The Equipment to use on either a Rental or Purchase basis will be found on these pages. Check them NOW and see the Savings you can make.

OFFICIAL PROPOSALS

Bids: February 25, 1954

New York State Road Work

NOTICE TO CONTRACTORS

STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of Highway Law, sealed proposals will be received until 10:30 A.M., Eastern Standard Time, on February 25, 1954 by Henry A. Cohen, Director, Bureau of Contracts and Accounts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y. for

SOIL EXPLORATIONS AND FOUNDATION INVESTIGATIONS AT VARIOUS SITES ON THE ROUTE 17 EXPRESSWAY, FAIR OAKS TO BRIDGEVILLE, ORANGE AND SULLIVAN COUNTIES, WHICH CONSTITUTES CONTRACT NO. SPEC. SM-62

Maps, plans and specifications may be examined and obtained at the following offices:

(a) Bureau of Contracts and Accounts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany 1, New York

(b) Mr. F. W. Donovan, District Engineer, 71 Frederick Street, Binghamton, New York

(c) Mr. Charles Schaefer, Department of Public Works, 270 Broadway, New York City.

The deposit for a set of plans, specifications and proposal forms is $5.00. A refund in full will be made to bidders for return of one set in good condition within 30 days of award or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.

The Engineer's estimate of cost for this work is $32,325.00.

Proposal for this contract must be submitted in a separate sealed envelope with the name of the contract plainly endorsed on the outside of the envelope. Proposal must be accompanied by draft or certified check, payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum of $1617.00. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Highway Law, as set forth in "Instruction to Bidders".

The right is reserved to reject any or all bids.

B. D. Tallamy
SUPERINTENDENT OF
PUBLIC WORKS

Bids: March 3, 1954

Sewer Construction

STATE OF RHODE ISLAND AND
PROVIDENCE PLANTATIONS
DEPARTMENT OF FINANCE
DIVISION OF PURCHASES

NOTICE TO SEWER CONTRACTORS

Sealed bids for constructing Moshassuck Valley Interceptor, Sec. A., in Pawtucket, R. I., will be received at office of State Purchasing Agent, State House, Providence, until 11:30 A. M. Eastern Standard Time on March 3, 1954 and publicly opened and read at that time.

Project involves 6,100 ft. of 48-in. sewer of centrifugally cast concrete pipe, including 5,000 ft. in tunnel, and appurtenant work.

Drawings and contract documents may be seen at above office or office of Blackstone Valley Sewer District Commission, 102 Campbell Ave., East Providence, R. I., or Metcalf & Eddy, Engineers, 1300 Statler Bldg., Boston, Mass., weekdays, except Saturdays and holidays, 8:30 a.m. to 4:30 p.m. and may be obtained from office of State Purchasing Agent on $100 deposit.

Bid security $50,000 certified check, bid bond, or cash; performance bond 100 percent.

Prevailing wage rates and public work labor laws applicable.

FRANKLYN A. ADAMS
STATE PURCHASING AGENT

Bids: March 9, 1954

Readvertisement

CONTRACT 688—GENERAL CONTRACT SUPERSTRUCTURES AND EQUIPMENT
CONTRACT 688E—ELECTRICAL EQUIPMENT
CONTRACT 688H—HEATING AND VENTILATING
CONTRACT 688P—PLUMBING AND GAS FITTING
For THE WESTCHESTER COUNTY, NEW YORK SANITARY SEWER DISTRICT OF NEW ROCHELLE SEWAGE TREATMENT PLANT

Sealed bids will be received in Room 508, County Office Building, White Plains, New York until 10:00 A.M. March 9, 1954 (Eastern Standard Time) immediately after which the bids will be publicly opened and read in Room 808 of said Building.

Bids have previously been received on August 14, 1953 and rejected. The work has been completely revised and is now readvertised.

Under Previous contracts, pipe lines and sub-structures for a primary sewage treatment plant have been completed.

The work under the General Contract 688 will include brick and concrete superstructures for three large and four small buildings having a cubical content of 800,000 cubic feet. The equipment to be installed consists of pumps, grit handling equipment, mechanical sludge collecting system for primary settling tanks, digester equipment, sludge, filter, incinerator and stack, laboratory, metering and chlorinating equipment for a designed population of 81,000 and flow of 31.5 M.G.D.

The work under the Electrical Contract 688E, the Heating and Ventilating Contract 688H, and the Plumbing and Gas Fitting Contract 688P consists of the remaining work necessary to place the sewage treatment plant in operation.

All contract domuments may be seen at Room 508, County Office Building. Bidders may procure plans and specifications for any of the four contracts upon a cash deposit of

CONTRACT 688 ....$50.00
CONTRACTS 688E, 688H and 688P.. $20 Each

which deposit will be refunded to bidders only, provided that all plans and copies of specifications are returned in good condition within thirty days after award of the Contract or rejection of bids.

All bids must be accompanied by a certified check, payable to the County of Westchester, New York, in the following amounts:

For CONTRACT 688........$75,000.00
For CONTRACT 688E.......$10,000.00
For CONTRACTS 688H and 688P.... $5,000.00 Each

The County reserves the right to waive any informalities in the bids, or to reject any and all bids. No bidder may withdraw his bid within forty-five days after the actual opening thereof.

DEPARTMENT OF PUBLIC WORKS
COUNTY OF WESTCHESTER
BY: JAMES C. HARDING
COMMISSIONER

Bids: March 2, 1954

Construction of Road

STATE OF NEW JERSEY
STATE HIGHWAY DEPARTMENT
TRENTON

NOTICE IS HEREBY GIVEN that sealed bids will be received by the State Highway Department for:

HIGHSTOWN-PRINCETON ROAD

Construction of Highstown-Princeton Road from Clarkesville-Grover's Mill Road to Vanhises Corner, West Windsor Township, Mercer County, Federal Aid Secondary Project No. S-12(2). Length 0.57 miles. The principal items of construction are:

Estimated:

10,000	cu. yds. Roadway Excavation
17,700	sq. yds. 5" Macadam Base Course
17,700	sq. yds. 3" Mod. Penetration Macadam
39,000	gals. Bituminous Binder
3,100	tons Bituminous Concrete
3,245	lin. ft. Drainage
2,400	lin. ft. Concrete Curb

Bids for the above will be received at the office of the State Highway Department, Assembly Room, Room 140, in the State Highway Office Building, 1035 Parkway Avenue, Trenton, New Jersey, on Tuesday, March 2, 1954, at eleven o'clock (11:00 A.M.—EASTERN STANDARD TIME), and will be opened and read immediately thereafter.

The receipt and opening of bids is subject to the proper qualification of the bidder in accordance with the provisions of the prequalification law and the regulations adopted by the State Highway Commissioner. Bidders must also submit a revised financial statement and statement of plant and equipment with their bid.

NOTE: The proposed project is a "Federal Aid Secondary Project" authorized by the provisions of Title 27 of the Revised Statutes of New Jersey and supplements, and by P. L. 769, 81st Congress, and is to be performed in accordance with the special provisions and requirements of the Bureau of Public Roads, Department of Commerce, as outlined in the specifications, which provisions require that labor be employed from lists furnished by the State Employment Service, 6-12 North Willow Street, Trenton, New Jersey. The attention of bidders is directed to the special provisions covering subletting or assigning the contract. The minimum wage paid to all common labor employed on this contract shall be $0.75 per hour. The minimum wage paid to all intermediate grade of labor employed on this contract shall be $1.00 per hour. The minimum wage paid to all skilled labor employed on this contract shall be $1.50 per hour.

Drawings, specifications and form of bid, contract and bond for the proposed work are on file in the office of the State Highway Department, Trenton, New Jersey, and may be inspected by prospective bidders during office hours. Plans will be furnished on a deposit of Ten Dollars ($10.00) for each set of plans upon application to A. Lee Grover, Chief Clerk, State Highway Department, Room 139, State Highway Office Building, 1035 Parkway Avenue, Trenton, N. J. Bids must be made upon the standard proposal forms in the manner designated in the standard State Highway specifications and must be enclosed in sealed special addressed envelopes bearing the name and address of the bidder and work bid upon on the outside, and must be accompanied by a certified check drawn to the order of the Treasurer of the State of New Jersey for not less than ten percent (10%) of the amount of the bid, provided that the said certified check shall not be less than $500.00 nor more than $20,000.00 and must be delivered at the above place on or before the hour named. Copies of the standard proposal forms and special addressed envelopes will be furnished on application. Bids not enclosed in sealed special addressed envelopes will be considered informal and will not be opened. The right is reserved to reject any or all bids.

Signed: STATE HIGHWAY DEPARTMENT
A. Lee Grover, Chief Clerk

Bids: March 1, 1954

Placing of Surcharge Fill at Proposed Site CAA Hangar 11

THE PORT OF NEW YORK AUTHORITY
NEW YORK INTERNATIONAL AIRPORT
JAMAICA, N. Y.

PROPOSAL NO. 373

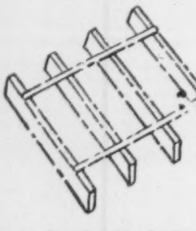
Sealed proposals for furnishing all labor, material and equipment necessary for placing of surcharge fill at proposed site of CAA Hangar 11, New York International Airport, Jamaica, N. Y., will be received at the office of the Director of Purchase of The Port of New York Authority, Room 900, 111 8th Ave., New York 11, until 11:00 A.M. (E.S.T.) Monday, March 1, 1954, at which time and place said proposals will be publicly opened and read.

Contract documents may be obtained upon request at the office of the Director of Purchase.

THE PORT OF NEW YORK AUTHORITY
Howard S. Cullman, Chairman

NATIONAL DISTRIBUTOR WANTED

Entire country open for distributor to stock and sell new line of open steel grating manufactured by well established firm.



Grating to be furnished distributor in stock panels, Distributor must stock, advertise, sell and do necessary fabricating. Only those sufficiently well capitalized to handle large volume on a national basis should apply.

RW-1543, Engineering News-Record
330 W. 42 St. New York 36, N. Y.

ENGINEERS

Foreign service. Graduate Chemical, Mechanical, Electrical & Construction Engineers with minimum of 5 years' experience. For specialized assignments commensurate with qualifications in various phases of construction, estimating materials and cost control, planning and refinery process work. Write giving full particulars regarding personal history and work experience. Please include telephone number.

RECRUITING SUPERVISOR, BOX EN-3

Arabian American Oil Company
505 Park Avenue
New York 22, N. Y.

CHIEF DRAFTSMAN

To assume complete responsibility of Drafting Room for Southwestern steel fabricator, supervising 20 to 30 workmen. In reply give full education, experience, background, age and salary expected.

P-1688, Engineering News-Record
520 N. Michigan Ave., Chicago 11, Ill.

Concrete Engineer

Challenging position available for engineer graduate, 28 to 45, interested and experienced in Laboratory and field research and development concerned with concrete pavements. Salary open. Chicago Suburban location.

P-1735, Engineering News-Record
520 N. Michigan Ave., Chicago 11, Ill.

When Answering BOX NUMBERS . . .

to expedite the handling of your correspondence and avoid confusion, please do not address a single reply to more than one individual box number. Be sure to address separate replies for each advertisement.

BRIDGE ENGINEERS

Recent Civil Graduate of accredited U.S. colleges. Should have not less than the following experience on bridges:

Detailers—2 years structural steel or reinforced concrete detailing.

Designers—5 years responsible work on structural steel and concrete including work on long span bridges.

Squad Leaders—3 years responsible charge of squad on structural steel detailing.

Please mail complete resume together with salary required to;

Howard, Needles, Tammen & Bergendoff
55 Liberty Street New York 5, N. Y.

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITIONS VACANT

BUILDING ESTIMATOR and Quality Take-Off Man. Graduate Engineer preferred. Thoroughly experienced, permanent position with well established contractor with top-notch organization bidding competitively public works and commercial buildings throughout the South. Stanley W. Newman Company, Inc., P. O. Box 1646, Mobile, Alabama.

STRUCTURAL STEEL Detail Draftsmen and Checkers. All types of Structures. Interested in only top quality men with five or more years highly successful experience. Send complete written information for investigational purposes. Bristol Steel and Iron Works, Inc., Bristol, Virginia-Tennessee.

WANTED—MAINTENANCE & Survey Superintendent for upstate N. Y. equipment fleet. Consists of 35 trucks (tractors, dumps, service units); 55 trailers (flats, vans, tanks, dumps) shovels, rollers, bulldozers and allied equipment. Must be capable of taking full charge of Maintenance & Service Department housed in well-equipped shop with 12-man crew. Should know Diesel engines. Prefer man with some crushing plant or similar experience. Excellent chance for man big enough to grow with well-established, expanding organization. Housing available. P-1648, Engineering News-Record.

BUILDING ESTIMATOR — Graduate Engineer preferred, Must be thoroughly experienced in bidding and constructing of Sewer Disposal Plants. Well established Construction Company, bidding throughout Southeast. Wright Contracting Company, P. O. Box 1580, Columbus, Georgia.

ESTIMATOR AND Sales in Virginia on salary base with at least 15 years experience primarily in take-off, pricing and selling in structural and ornamental shop employing 80 men. Permanent position with progressive company. Applicant must have been similarly employed. State experience in detail. P-1549, Engineering News-Record.

WANTED: STRUCTURAL steel designer. Must be experienced in design of highway bridges and under 50 years of age. Submit brief outline of experience and state minimum starting salary acceptable. Address reply to the Bridge Division, Tennessee Department of Highways, Cotton States Building, Nashville, Tennessee.

WELL ESTABLISHED detailing concern — N. Y. C., Phila., area—needs fast accurate steel detailers, checkers. Usual privileges Salary plus cash profit sharing every job. Give complete experience resume. P-1497, Engineering News-Record.

WANTED: SUPERINTENDENT for Illinois Highway paving and Grading. State age and experience. Salary plus per cent of profits. P-1644, Engineering News-Record.

WANTED — SEWER Foreman, experienced practical man. E. A. Meyer Const. Co., 1539 Morrow Ave., North Chicago, Ill.

WANTED: CONSTRUCTION Superintendent by March 15 for work in New England, with experience in industrial type buildings and Government projects. Must be capable of taking complete charge of work, including concrete and masonry. Send full record of education, past experience, references, and salary expected. P-1545, Engineering News-Record.

SEWERAGE DEPARTMENT Superintendent—Take charge of primary treatment plant and maintenance of sewerage system. Experience required. Salary $400 per month. Submit age, experience and references. Write City Engineer, South Milwaukee, Wisconsin.

WANTED

CIVIL ENGINEERING GRADUATES FOR TURNPIKE WORK IN THE MIDDLE WEST

With experience in the following classifications.

SURVEYORS, STRUCTURAL DESIGNERS
MATERIAL and SOILS ENGINEERS
INSPECTORS.

Mail experience record with salary required to:

HAZELET & ERDAL
53 W. Jackson Blvd. Chicago 4, Ill.

SELLING OPPORTUNITY OFFERED

SALES ENGINEER—Pittsburgh, Pennsylvania and Albany, New York territories open with established national concern selling prefabricated metal products to engineering and construction markets. Positions offered are permanent and present excellent future with aggressive, progressive and expanding organization. Engineering degree desirable. Previous sales experience unnecessary. Age 24 to 30. Car furnished. Complete training program. Salary and bonus. RW-1420, Engineering News-Record.

EMPLOYMENT SERVICES

SALARIED PERSONNEL, $3,000-$25,000. This confidential service, established 1929, is geared to needs of high grade men who seek a change of connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Jira Thayer Jennings, Dept. L, 241 Orange St., New Haven, Conn.

OVERSEAS CONSTRUCTORS — Digest Guide of most active construction-engineering firms, oil co's., UN & gov't. agencies now hiring for foreign projects. Send $1.00. Cove-McKane Int., P. O. Box 126-E, NY 4, NY.

POSITIONS WANTED

SURETIES — CONTRACTORS — Architects — Owners: If your construction project needs speeding-up — coordinating — reorganizing, or taken over and managed with present personnel, or if you just need a lift, I probably can help you, 35 years Construction management and organizational work. Best of references from banks, sureties, contractors and architects. Inquiries invited B. F. Bleuer, 116-Mona Drive, Buffalo 15, N. Y.

ATTORNEY-CIVIL Engineer—29—8 years experience as a Civil Engineer desires position with engineering organization, contractor, law firm or corporation where combination of engineering and legal knowledge will be utilized. New York area. PW-1614, Engineering News-Record.

CONSTRUCTION SUPERINTENDENT or Engineer, 31, BSCE. 7 years heavy and industrial experience. Field supervision and office experience. Desire responsible position with progressive southern contractor. PW-1656, Engineering News-Record.

CIVIL ENGINEER—BSCE. 17 years field and office experience, steam power plants, earth dam, sewage and water plants, sewers, water mains. Desires permanent position. PW-1596, Engineering News-Record.

STRUCTURAL ENGINEER: over 25 years experience in structural steel and reinforced concrete. In charge of medium sized engineering organizations for last 15 years. Technical graduate. PW-1610, Engineering News-Record.

TUNNEL CONSTRUCTION Superintendent—20 years wide experience driving and concrete lining, excellent following. Available March first. Complete resume on inquiry. PW-1640, Engineering News-Record.

GRADUATE CIVIL Engineer. Seven years varied construction experience doing quantity take-off, assembling bids, coordinate sub-contractors, etc. Desire position in office of General contractor. Prefer Mid-West. Reply PW-1555, Engineering News-Record.

(Continued on opposite page)

SPAIN

Construction manager, recently completed foreign assignment. Has contacts with high ranking civil and military authorities of Spain. Seek position with major construction company interested in joint venture with Spanish contractor.

PW-1714, Engineering News-Record
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POSITIONS WANTED

(Continued from opposite page)

GENERAL SUPERINTENDENT available soon, 20 years experience in building construction. PW-1447, Engineering News-Record.

CONSTRUCTION MANAGER. Industrial Constr. Exper. multi-project field supervision, Civil Engr. Avail. Feb. 15. Anywhere USA, 522 Lime St., Redlands, Calif. Phone 4-6766.

GRADE AND paving Supt., age 37, married, highway and airport construction. Engineering experience. Prefer location in South or South America. Best references. PW-1738, Engineering News-Record.

GOOD MAN seeking better job. Civil Engineer, 31, New York Registr. General Contractors Estimator-Supt. Heavy concrete experience, large projects. Know field costs. New York, Westchester, Long Island vic. Reply PW-1737, Engineering News-Record.

CIVIL ENGINEER, Reg., graduate, 33. 6 years experience in planning, estimating and designing, dealing with hydraulic, earthwork, and structures. Present salary $5500. Pacific Coast preferred. PW-1736, Engineering News-Record.

ENGINEER, B.S. and M.S.C.E., 14 years varied structural experience, Civil, Ship, Aircraft, and Research. Would like to learn consulting through association with older engineer having small office, west or south. PW-1692, Engineering News-Record.

STRUCTURAL ENGINEER, registered, 28 years subways, waterfronts, buildings, power and chemical plants, available for responsible position anywhere. PW-1720, Engineering News-Record.

CONSTRUCTION SUPERINTENDENT: Graduate Civil Engineer registered, member of ASCE and NSPE, age 44, 20 years wide experience in general construction including industrial, schools, bridges and miscellaneous. PW-1719, Engineering News-Record.

ENGINEER & FOR. Ser. Grad. Matr'l testing, heavy cons't. Specialty soils & asphalt, 28 yrs. single, passport, 3 o'seas contracts, French & German W/ some Spanish & Arabic, domestic or foreign. PW-1717, Engineering News-Record.

SALES ENGINEER—Foreign Business Analyst with construction, business administration statistical, financial, trade, and government experience. 38 years old. Speak Spanish. 1953 assignments included Mexico, So. America. PW-1718, Engineering News-Record.

STRUCTURAL ENGINEER, registered, 28 years subways, waterfronts, buildings, power and chemical plants, desires part time work. PW-1721, Engineering News-Record.

ENGINEER REG. P.E. 4 years construction field, 5 years steel fabrication, 4 years timber fabrication. Chief Engineer Home Fabrication, Mid-West. PW-1702, Engineering News-Record.

SUPT. OF Bldg. Construction Eastern firm wishes position Far West. 30 years exp. in carpentry & general constr. good record PW-1701, Engineering News-Record.

PARTY CHIEF — Draftsman, 15 years experience-Highways-Bridges & General construction—Available March 1st 1954. Write R. S. Fleming, 1314 Spruce St., Phila. Pa.

CONSTRUCTION ENGINEER. C.E. graduate, young, responsible. Presently employed as Contractor's Engineer on $7 million project. Familiar with all phases of General Construction. Would like connection **with expanding** company leading to **good executive position.** PW-1691. Engineering News-Record.

CONSTRUCTION ENGINEER—C.E. graduate with 25 years successful experience supervisory capacity both field and office. Sound knowledge all phases general construction and some industrial chemical. Seeking connection where top man required. PW-1307, Engineering News-Record.

SELLING OPPORTUNITIES WANTED

FORMER SALES Manager, 20 yrs. experience with large equipment manufacturer, wishes to represent industrial and construction equipment and material accounts for the western part of N. Y. State. RA-1469, Engineering News-Record.

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SALES ENG'R. desires to represent manfgr' of product sold to bldg. const'n trade N. Y. City area. Well acquainted arch's, large Indust'l. firms, gen'l. Cont'rs. SA-1703, Engineering News-Record.

BUSINESS OPPORTUNITIES

Experience Civil and Structural engineer interested buying or associating with established high-grade practise. BO-1707, Engineering News Record.

American licensed British Manufacturer of earth moving and other industrial equipment is expanding into new development territory and wishes to hear from all aggressive U. S. companies who are interested in the distribution, or the ultimate licensed manufacture of their product within the sterling area. All replies received in confidence, and first class American references gladly supplied. Cheshire Engineering Co., 19, Berkeley Street, London, W.1., England.

Lady having inherited a large industrial establishment ,about 100 modern machines) situated in Paris suburb, having to do with manufacture of precision equipment, is looking for associate. Write Havas No. 348/598, rue Vivienne 17, Paris, who will forward.

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Used. Good Condition 10 to 20 Thousand Sq. Ft. *UNIVERSAL FORM PANELS.*

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25¢ each

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3—1000 Barrel bolted fuel oil tanks—8'-0" high x 30'0" diameter—above ground—located in Toledo, Ohio. Available Spring 1954.

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65 to 1575 CFM, Electric & Diesel Driven;

CRANES

Whirley 5 ton @ 100', Locomotive type 25, 50 ton, etc.

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Contractor's Equipment, Low Bed Trailers, Shovels, Dozers, Cranes, etc.

Also: Dump Trucks, Trailers, and Euclids.

Will buy one piece or entire lot.

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241 Mystic Ave. Medford, Mass.
Mystic 6-3500

WANTED

1 or 1¼-yard crawler crane. Condition important.

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For Sale or Rent

1—P & H Modell 855 Crawler Shovel, 2 yd. capacity. Cat. Diesel power. Reconditioned. Crane available.

1—P & H Model 655B Crawler Crane, 1½ yd. capacity. Late model. Cat. Diesel.

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6—25 YD. R. U. LeTOURNEAU SCRAPERS, overhauled, tires good, Serials S9062, S9519, S9643, S9656, S8991, S8992, $4500.00 each.

1—MODEL 9 BV EUCLID LOADER, Serial 9 BV-121, powered with GMC Diesel 671 RA 63-6A-9046, completely overhauled and good as new. Has new belt never used. Price $18,000.00.

1—6 TON BROOKVILLE DIESEL LOCOMOTIVE 36" gauge, International UD9 Engine 5 speed transmission, 20" rolled steel wheels, mechanical brakes, gas starting engine, electric lights, enclosed cab, used 3 months, price $1500.00.

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20 Ton P&H Model 250 Crane—Clamshell Comb. on Mack Truck........$9500.00

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BUCKEYE #12 TRENCHER

Serial #4324, digs 24" x 5½ ft. deep, special long conveyor, excellent condition, located in New York City $3750.00

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LIMA 1201 Diesel Comb. Stand. 3½ c.y. Shovel, Crane-Dragline with 100 ft. boom, 18'-11" Extended Cats, 44" Treads, with extra complete Highlift 2½ c.y. Shovel Front and Light Plant. S/N 5313. Located Littleton, N. H.

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1 48B Bucyrus Erie Shovel 2 cy diesel
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75 foot boom, 3 drum Buffalo Hoist, 75 HP motor, with derrick house and electrical controls.

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LOW COST INSTALLATION AND OPERATION

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LORAIN 87 with 2 Complete Fronts
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Completely Rebuilt From Ground Up In 1951

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3—LeTourneau Model C 11, with 13 yd. Scraper, 3 years old, excellent condition. $8,000.00 each.

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CRANES—Wheel Mounted—Swing and Stir Booms
CRANES, Truck Mounted
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FORK LIFT Trucks
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STEAM GENERATORS
SURFACERS—Concrete
SWEEPERS—Street and Road
TAMPERS, Mechanical & Back Filler
TOWERS—Steel Tubular, Hoisting
TOWERS—Jaeger, Portable "Hoister"
WOOD TOWER BUCKETS AND HOPPERS
TOURNAPULLS—Diesel and Scrapers
TRACTORS—Rubber Tired and Accessories, Gas—Diesel
TRACTORS—Crawler, Diesel with Scrapers, Winches and Dozers—Pipe Layers
TRENCHERS OR DITCHERS — Wheel and Ladder Types
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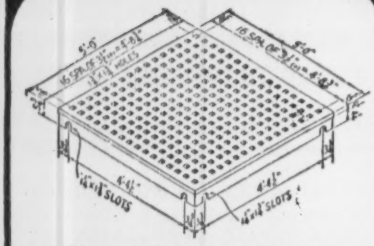

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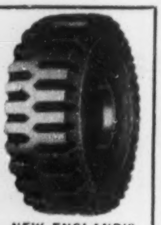

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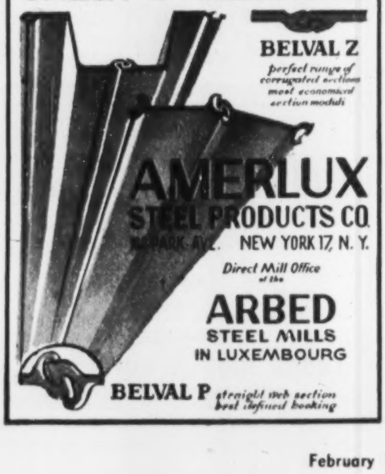

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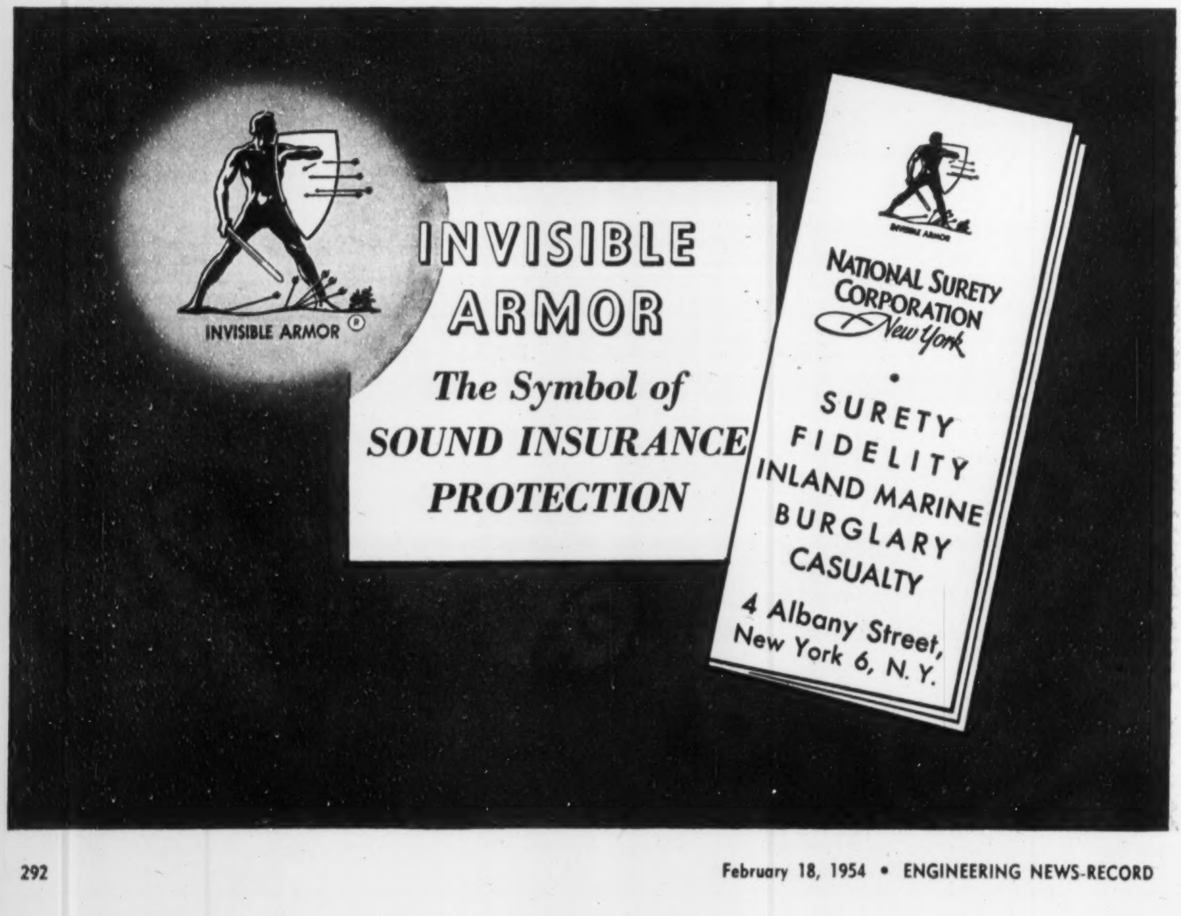

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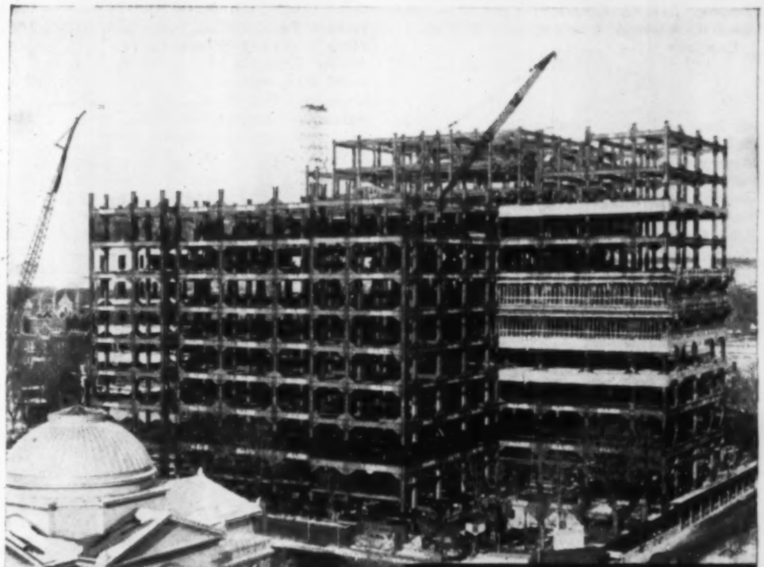

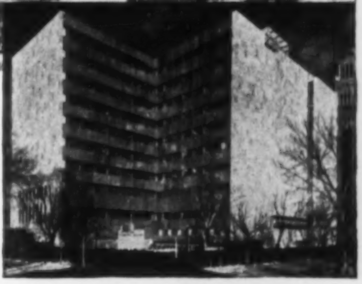

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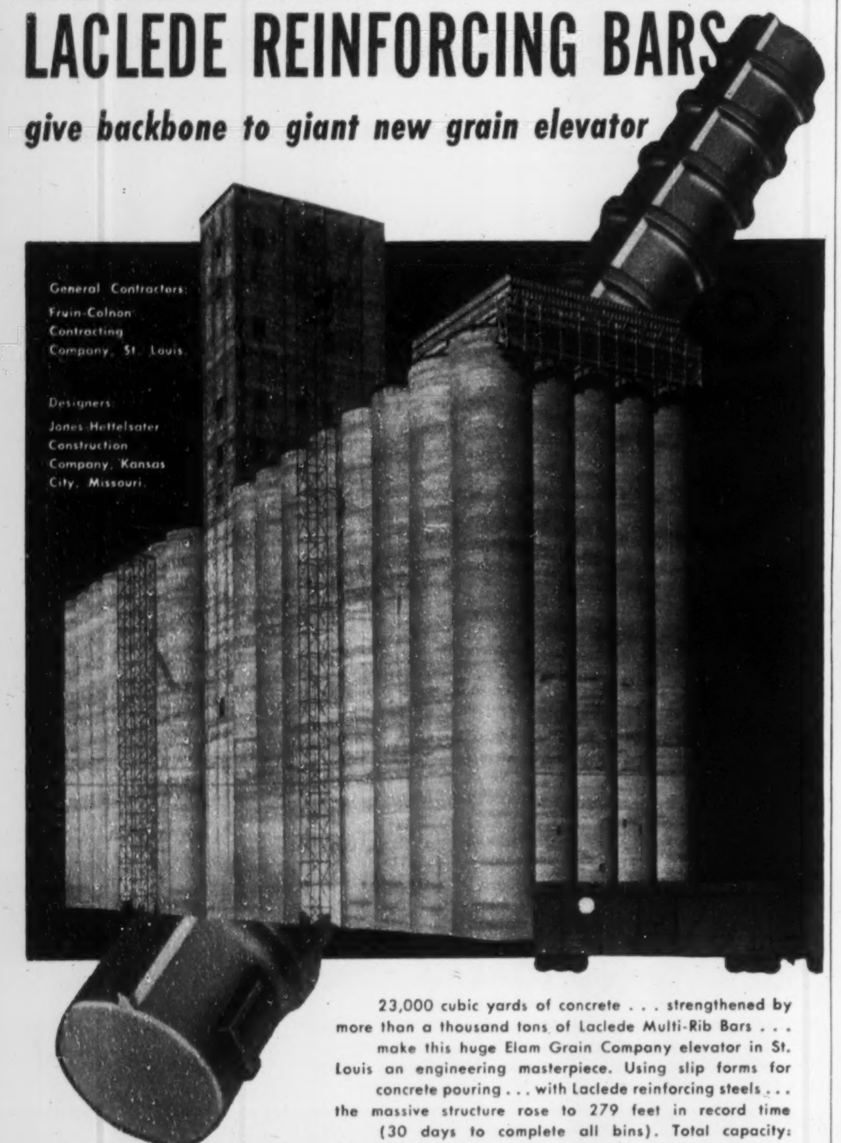

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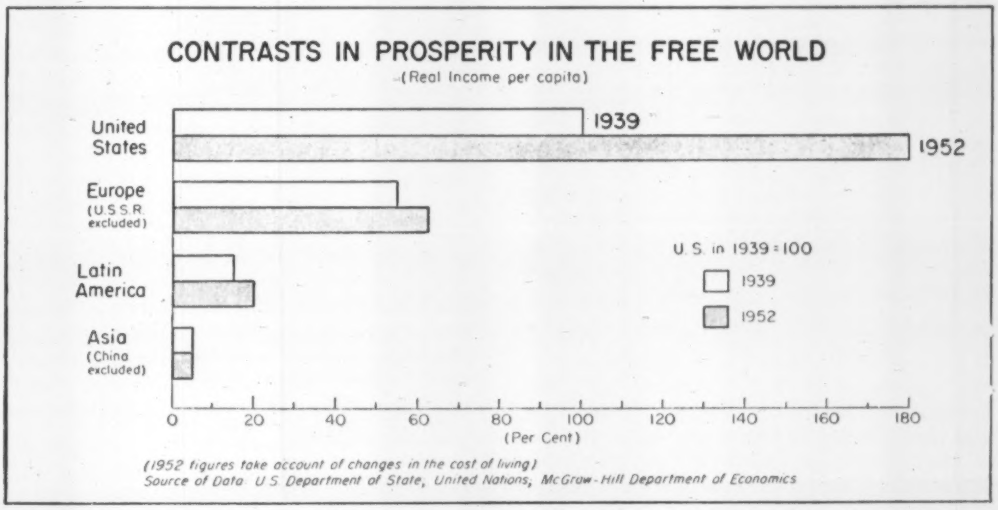
Contrasts in Prosperity Endanger the Free World

The chart in the middle of this page summarizes a situation of profound importance to every American. It shows that:

1. On the average, Americans are vastly better off economically than most other people in the free world, and
2. In recent years the gap in income between the average American and the average European, Latin American or Asian has greatly widened.

A Mounting Contrast

Even greater is the contrast between the real incomes of Asians and Americans. Today most Asians are no better off economically than they were back in 1939. On the other hand, the real income of the average American has almost doubled. As a result, the real income of the average Asian—always small by our standards—is now only a tiny fraction of that of Americans.


CONTRASTS IN PROSPERITY IN THE FREE WORLD

(Real Income per capita)

(1952 figures take account of changes in the cost of living)
Source of Data: U.S. Department of State, United Nations, McGraw-Hill Department of Economics

The chart shows that, at the outbreak of World War II, the real income (that is, actual purchasing power of income) of the average American was substantially higher than the average European's and much higher than the average Latin American's or Asian's. Since then, the European and Latin American have become better off. But the improvement in the economic lot of the average American has been so great that the others have been left far, far behind.

It must be remembered that the figures used to construct the chart are of varying quality. The fact is that few of the poorer countries have reliable statistics. However, it is generally agreed among competent observers, that the figures here presented offer a correct impression of the wide disparity in the average of real incomes between various parts of the free world. The figures, of course, have nothing decisive to say about spiritual and cultural values. In these, countries with relatively little material prosperity may be rich.

It is possible to draw a variety of morals from the story of lagging growth of income in other parts of the world. For one thing, it reflects the dynamic force of private enterprise. Private enterprise is characteristic of our economy far more than it is of most of the other free economies. The chart also reflects the fact that we are bountifully blessed with the natural resources essential to a high level of real income. Moreover, we did not suffer from the devastation and waste of two world wars as did many of the other free nations.

Narrowing the Gap

But perhaps the most important message which the chart conveys is one of warning. It warns that something must be done to narrow the gap in prosperity between America and other parts of the free world, if that world is to be united successfully in the struggle against totalitarian Communism. Writing in the HARVARD BUSINESS REVIEW, Kenneth E. Boulding recently put it this way:

> *"The crux of the problem is how to raise the three-quarters of the world that live on a low level to the high level of the other quarter, for it is precisely this wide disparity that makes our world so unstable. American-Russian relations, for instance [are] . . . complicated almost unbearably by the fact that each power is competing for the support of the vast fringe of underdeveloped countries . . . These countries are dissatisfied with their present state and are hovering between the two cultures, wondering which offers them the best chance of shifting from their present low-level to a high-level economy."*

Very real danger threatens from any feeling which may develop in the less fortunate free nations that our enviable economic progress has been made at their expense. Instead of viewing the American economic system as a model that might be followed by their own countries, they may be led to see in it a menace to their well-being. If Communist propaganda can persuade these people that their alliance with the free world will only result in their dropping farther and farther behind an increasingly prosperous United States, they will be driven to the side of totalitarianism.

Test of Effective Leadership

How can these free nations on the lower half of the income ladder be helped to alleviate the conditions that keep them there? Surely this question poses a whole series of complicated problems. Yet, if we do not exercise some effective leadership toward their solution, we can be sure that Russia will take advantage of the situation. In these circumstances, it is essential to both the stability and security of the free world that we help our less prosperous neighbors make satisfactory headway.

This does *not* mean that the United States should sacrifice its own economic progress in favor of some sort of global leveling scheme. On the contrary, a continually expanding and stronger economy is essential if we are to provide any real aid to our friends. Also, it goes without saying that our friends must be disposed to do all they can to improve their own economic position, if our cooperation to that end is to be effective.

Great Skill Required

Our part in a program to achieve this goal calls for a high degree of skill and statecraft. It involves international trade policy, which, in itself, presents a perplexing range of problems. It involves also programs of foreign technical and economic assistance. And expanded foreign investment must play a key role in a balanced program to strengthen the economies of the free world for our common good.

The Commission on Foreign Economic Policy, headed by Clarence Randall, has recently submitted a report, embodying the results of a monumental inquiry into our foreign economic relations and measures to improve them. From the very nature of the subject, discussion of the report is bound to be attended by much controversy and conflict. However, an awareness of the facts presented by this chart should inspire us to accord to the problems posed by the Randall Commission the careful and sober consideration they must have if any real progress is to be made in raising the general standards of human well-being throughout the free world. Our willingness and ability to do this have now become the real test of our statesmanship, both at home and abroad.

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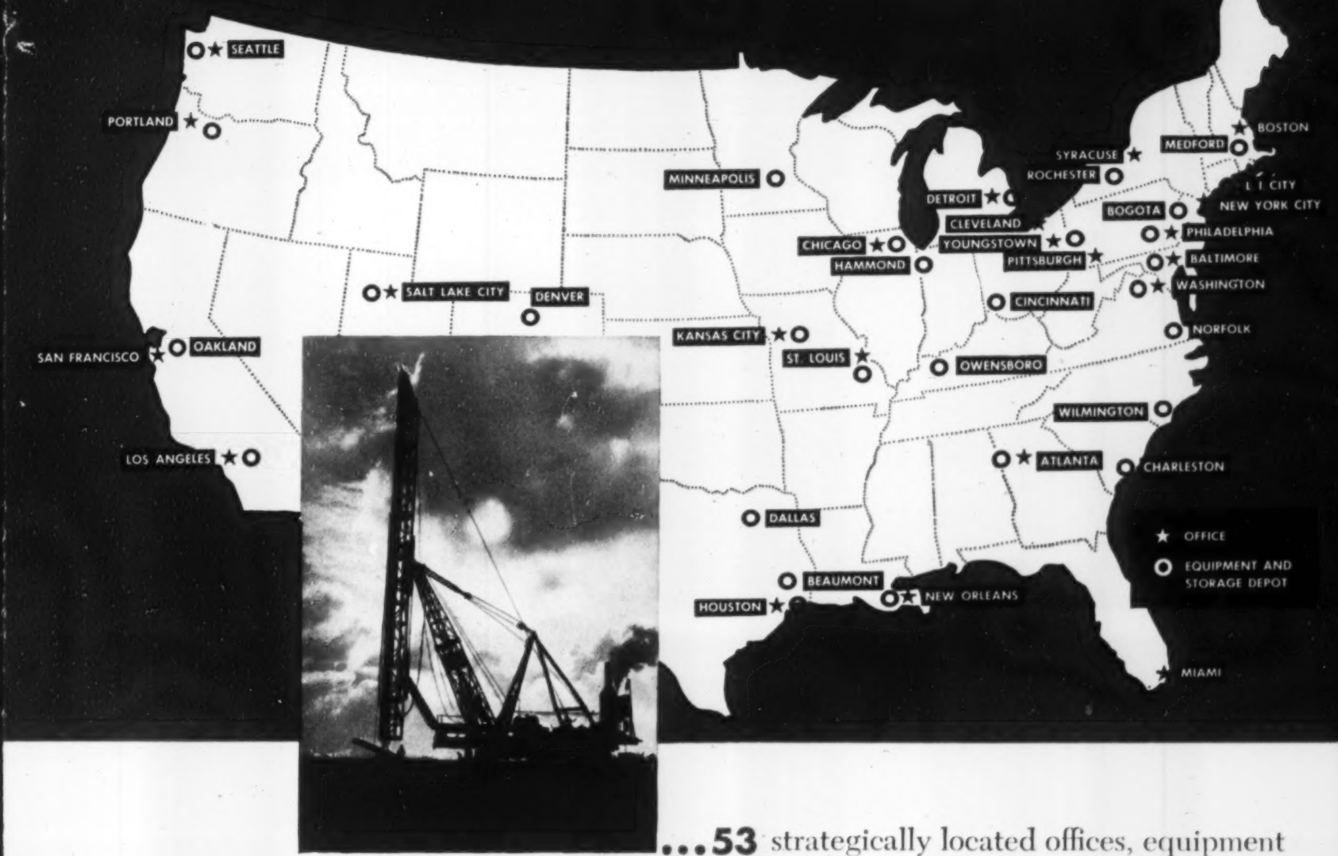
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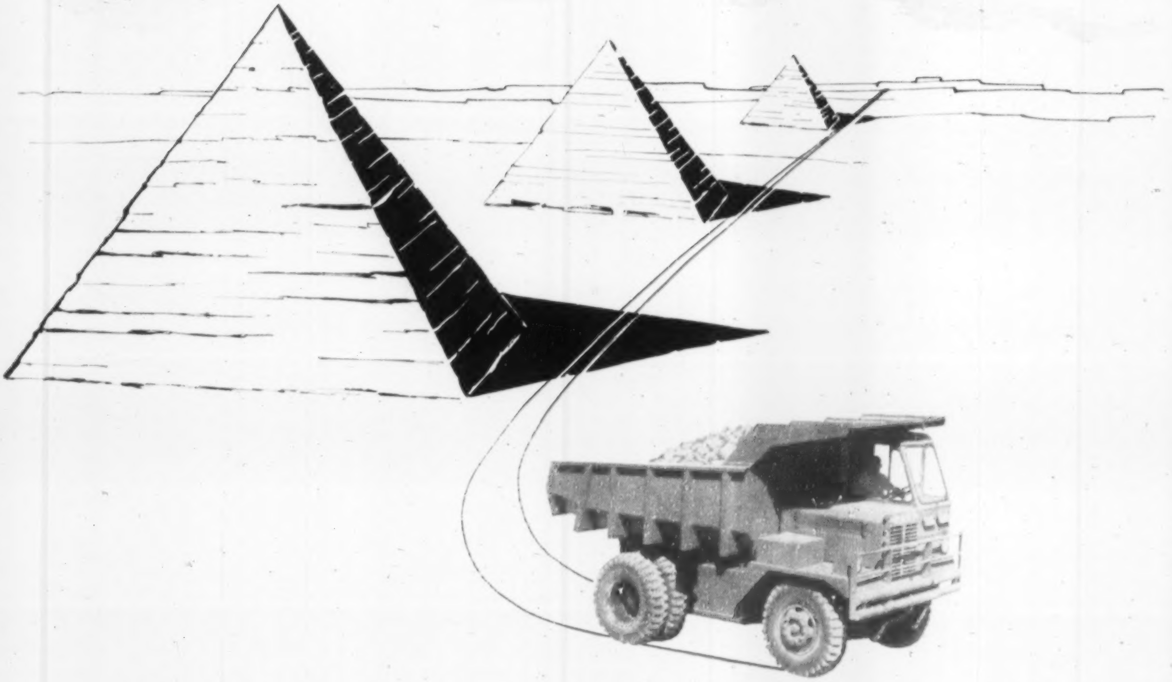

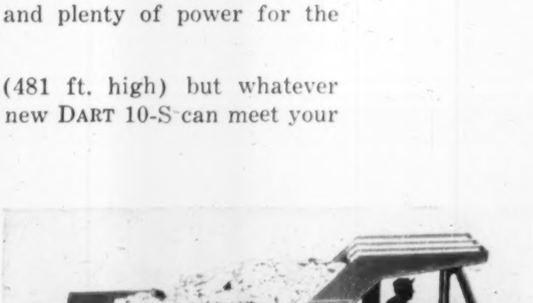

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